N.A.C.A. BULLETIN

VOL. XXXVI, No. 6 FEBRUARY, 1955

How Standard Costs Help In Managing a Steel Company

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The present article is a study and illustration of specific uses of standard costs to supply relevant information not only for primary cost control, as of material and labor called for by standard practice (important as this control is), but also for a whole range of normal if irregularly occurring, profit control and new facilities problems. Instances are given and followed through to solution in a series of capsule cases. Standard costs are also pointed up as an aid in the timely activity of forecasting.

IN WRITING ON THE SUBJECT of standard costing as an aid to management, I am treading a path that is well worn. This article discloses pertinent particulars of a standard cost system which our management is using every day with what we like to believe is moderate success. If in any way it should aid in furthering the effectiveness of costing techniques used by others, my objective will have been achieved. The presentation will consist mainly of a review of some examples of standard costs in action. However, I would first like to propound and answer the following questions:

1. Why did we adopt standard costs?
2. What kind of standard cost system do we use?
3. What are the advantages of standard costs?
4. What cost concepts are involved in management decisions?

Consideration of these questions should not be considered to be an unnecessary detour. A little background on the issues reflected will help to portray the system as we see it and to put readers in a better position to appraise its effectiveness.

Three Pertinent Questions

United States Steel management reached the conclusion late in the 1930's that improvement in the corporation's methods of cost accounting for steel-producing operations was needed. Various factors led to this conclusion. The system in general use at that time employed as its principal measuring stick simply the "cost per ton produced" in attempting to determine whether cost performance was good or poor. We had measured ourselves against past performance which often can be an unreliable bench-mark. Further, the simple act of merging poor performance with good throughout the manufacturing sequence made analysis all the more difficult. Without belaboring the point further, let us say that the so-called actual cost system was totally inadequate for the problems which confronted us. Standard costs seemed to be the answer, and fifteen years' experience have strengthened that conviction.

Our standard cost system is built upon engineered standards which are attainable (perhaps "tight but attainable" would better describe the basis), fixes responsibility for cost performance in each segment of our operations, recognizes the impact of volume or rate of activity by establishing a normal volume and evaluating departures, takes into consideration fixed and variable costs and their dissimilar behaviour at varying levels of operations, and provides consistent and equitable yardsticks for measuring both absolute and relative performance. Let me hasten to add that we did not conceive and install the standard cost system in a flash of ingenuity, then lean back and admire it for fifteen years. We are constantly revising standards and refining the system to meet changing conditions but, thus far, completely consistent with the original scope and objective. Let me also add that it has been a difficult, time-consuming, and expensive undertaking, and I do not commend it to the faint of heart.

To us, several advantages seem most essential. We eliminate guess-work when we adopt scientifically engineered standards. Men are more willing to be judged against such standards. The performance of each cost center is free from influence by the performance of other cost centers. Hence, a man is less likely to "pass-the-buck" for his own deficiencies. The impact of volume fluctuations on performance measurement has been largely removed and, with elimination of this influence, a fruitful source of alibi for poor cost results has disappeared. Finally, the building-blocks of a standard cost system provide great flexibility. They can be combined in many ways to yield answers not ordinarily attainable with a so-called actual cost system, and they provide a firm base for estimating and forecasting.

A Significant Fourth Question

What important cost concepts are involved in management decision? We must know the answer to this if standard costs—or any cost system—are really to help. Management time is spent on such questions as adding or abandoning a product or a facility, whether to sell more or less of Product A or B or C, whether to absorb freight to compete in a specific market area, whether to replace or expand existing facilities or to build new facilities in new locations, and whether to alter the loadings on similar facilities at different locations. These and countless other problems have one thing in common—a predictable effect on profits, which will be in the right direction if the facts are brought to bear on the subject. The costs which are relevant to problems of this sort are not static. The cost which is correct for one set of circumstances can be completely wrong for a different set of circumstances. With all our mechanization we have not reached that utopia in which we simply tell our troubles to an electronic brain and get an immediate, sympathetic, and infallible answer.

We, as accountants, have the continuing responsibility to develop the best possible evaluations of facts and to make certain that our management thoroughly understands the evaluation, its use, and its limitations. The latter portion of the responsibility is of paramount importance, because there is a tendency in industry to assume that, as soon as a problem had been defined, it can be solved by the bookkeepers merely adding up the numbers in their neat, methodical way. This attitude probably springs from the feeling that, since arithmetic is an exact science, anyone who delivers some columns of figures properly cross-footed, balanced, and carried out to an impressive number of decimal places, must automatically have the right answer. Nothing, of course, could be farther from the truth. Recognizing this, in our organization, we frequently find it desirable to spend as much time explaining an evaluation and the underlying facts and assumptions as we do in arriving at it. We have found that concepts such as those dealt with in the immediately following paragraphs are encountered in most management decisions of an economic nature and are not always thoroughly understood by those who may use the evaluation.

The first of these concepts for brief mention is, in our case, the value of an added ton. A potential additional unit of production has a great fascination for most of us. Since all of the fixed expense is being borne by the existing production, this added unit—providing that it can be produced without the use of marginal facilities, abnormal sources of materials, power and fuel, overtime, etc. —will contribute additional profits to the extent of the fixed expense values. In evaluations of the added unit, management is advised of all factors involved,

including the contribution made through absorption of the fixed expense. In this way, we assist management in its decision on whether or not the added unit should be produced. There are, however, potential dangers in this approach, the greatest being using it where it is not applicable.

Another significant concept is normal volume and mix. Since costs should help plan the future, rather than merely chronicle the past, they should be geared to anticipated future levels of operations and future mixtures of products. Accordingly, we establish in our cost system a normal volume and mix. We engineer our standards for that volume and mix. Thus, not only can we set a specific operating plan for the normal volume, we can also say what the profits should be at normal and why the normal profits were not realized. In other words, we can measure profits and performance, as planned and as executed. Yet, despite its usefulness, no concept is more difficult to assimilate than that of normal volume. It represents a set of conditions which never existed really and most likely never will. Why then is it so important? Because it permits a formalized and integrated plan of sales and operations, which serves as a target for the entire organization—and it helps to identify who is missing the target and why.

Proper expression of costs and profits is still another concept important to the task of rendering accounting service within management. Let me confess immediately that this is a confusing consideration. It is elusive but important. In our industry, it is traditional to express costs and profits per unit of finished production, namely, per net ton. This leads to the erroneous conclusion that costs and profits per net ton will measure the economic impact of any problem confronting us, a condition rarely true. Let us assume that we are operating at capacity and want to determine what products should be solicited to yield maximum overall profit. If basic steel production is our limiting or "bottleneck" facility, we should choose the most profitable products in terms of profit per net ton of ingots consumed. However, if some intermediate mill were the bottleneck, we should choose in terms of profit per operating hour of that mill. If shortage of manpower or of fuel or of power is the limiting factor, then the optimum profit per manhour or per b.t.u. or per k.w.h. would be the logical choice. Obviously, the costs and profits would have to be converted to different units of expression to meet each of these situations.

Also, the kind of profit figures must be tailor-made for many evaluations. To assist in price establishment, we need cost and profit results after all elements of cost have been included. To select the most profitable product mix for the complete product line, we need cost and profit results prior to fixed expense. To choose between two alternative courses of action, we may only

need to evaluate the differences between them, in which event we ignore the common elements of cost and deal only with fractional costs, i.e., those which will not be the same for both courses of action. It may be difficult to tailor the costs to the problem at hand. It may be even more difficult to convince management that you have the right answer, particularly if it is expressed in a new or unusual way. Yet, the challenge is present in most business problems and we should not abandon the right answer for the easy one.

Finally, required limits of accuracy is a necessary consideration in the useful employment of costs. In defining each problem for evaluation, we should carefully establish these limits. There is no point in delaying a management decision while we carry an answer out to four decimal places if accuracy to the nearest dollar, ten dollars, or hundred dollars is all that is required to settle the issue. Similarly there is no point in implying greater accuracy than the underlying facts warrant. If the basic data are accurate only to a tolerance of plus or minus 5 per cent, why mislead by implying greater accuracy in the final answer.

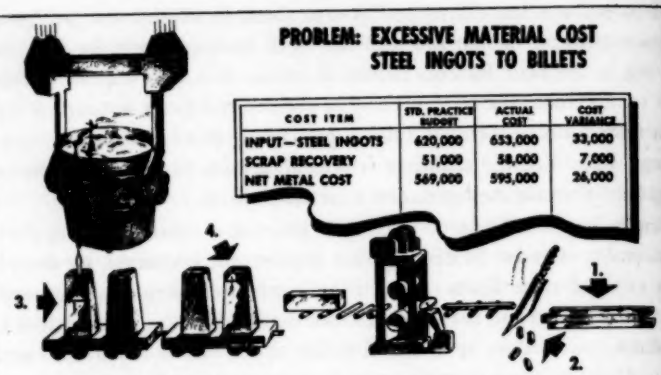
Cost Control — Material Cost

The four cost utilization concepts just touched upon are only a few of those involved in management decisions. However, they may serve to indicate the nature of the task. Let us now move forward to some revealing instances of standard costs in action which involve these and many other concepts of importance to those who make the final decisions. The illustrations to be offered have, of course, been altered in substance and in the extent of detail encompassed. They represent, however, a sampling of the types of cost problems involving management decisions which we encounter regularly in the steel business and which involve principles used and problems met in most other businesses as well. The first two, which deal with material and with indirect labor, represent typical uses of standard costs in the analytical phase of current control of operating costs. They illustrate the basic method of attack on problems involving overuse of material and of man-power, i.e., that of determining the principal cause or causes by measuring the various alternatives against standards and eliminating those which do not bring to light an off-standard condition, finally leaving a residue of pay-dirt.

In the steel industry—as in many other industries dealing with large volumes of material and many stages of processing—we find that practice changes, even though involving relatively small percentage yield effects, have a disconcertingly frequent habit of showing up in the variance (and, therefore, in the profit and

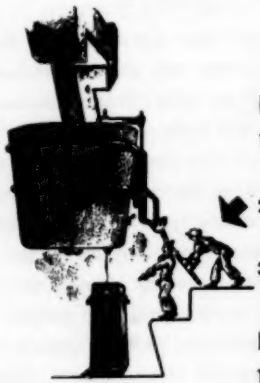
PROBLEM: EXCESSIVE MATERIAL COST STEEL INGOTS TO BILLETS

COST ITEM	STD. PRACTICE BUDGET	ACTUAL COST	COST VARIANCE
INPUT—STEEL INGOTS	620,000	653,000	33,000
SCRAP RECOVERY	51,000	58,000	7,000
NET METAL COST	569,000	595,000	26,000



ANALYSIS DISCLOSES:

1. NO. OF BILLETS PRODUCED FROM EACH INGOT AS SCHEDULED, BUT ORDERS FREQUENTLY SHORT ON INGOTS.
2. SHEARMAN STATES THAT CLEARING CROPS ARE EXCESSIVE.
3. BUTT (UNUSABLE SHORT) INGOT OCCURRENCE OVER STANDARD.
4. INGOT LENGTH FOUND TO BE CONSISTENTLY OVER ORDERED LENGTH.



CONCLUSION:

1. REVIEW SCHEDULING, MOLD MARKING & POURING PRACTICES FOR ALL GRADES.
2. INSTRUCT STEEL POURERS TO FOLLOW STANDARD PRACTICES.
3. METALLURGISTS TO FOLLOW UP ON RESULTS OVERALL AND AS BETWEEN GRADES.

RESULTS:

1. INCREASED GOOD PRODUCT YIELD BOTH AT FURNACES (DUE TO FEWER SHORT INGOTS) AND AT ROLLING MILL (DUE TO LESS GOOD STEEL LOST AT SCRAP SHEAR).
2. REDUCED RE-SCHEDULING TO MAKE UP DEFICIENCIES, IMPROVED PERFORMANCE ON SHIPPING PROMISES.

EXHIBIT 1

loss) statements as very real and significant items. The problem of isolating and identifying the cause of out-of-line material costs occasionally results in a study reaching back into a prior operation, since, in these cases, the responsibility where the loss occurs may well have been forced into a nonstandard practice due to something which a prior operation may have done or not done. This was the case in the first example (Exhibit 1), in which a study was made to determine the cause of an overstandard metal loss in a small rolling mill producing billets directly from ingots.

We find the first clue to the nature of the problem in the statement of variances, which indicates that in terms of finished product (in this case, billets), the material input cost was excessive for the period involved by $33,000, offset to some extent by overnormal recovery of scrap. In this operation, by way of explanation, the unusable portion of the steel ingot is sheared off at the top and bottom as "crop ends." It follows, rather naturally, that where the input is excessive, the scrap recovery will generally be also, particularly when there is no latitude allowed in the dimensions of the product being produced from the ingot. Material-providing for these operations is a coordinated operation, since the length of the billets to be produced must be uniform and cannot exceed the width of the reheating furnace through which they must pass in a subsequent operation. Therefore, since the size (and weight) of the billet is known, the ingot must be produced to a total size which will, in turn, produce a multiple of the billet weight in good product and leave an adequate—but not excessive—amount for scrap. The multiple is generally set in accordance with the best practice possible, considering the equipment available, and permits determination of the number of ingots which are required for the desired number of billets from each ingot rolled, as called for on the schedule. However, the providing of ingots frequently appeared to be short of requirements and the mill was short of billets on many orders. A review of the scheduling practice for the furnace department indicated that ingots were ordered poured to the correct height to provide the proper number of billets per ingot and, further, that the tonnage scheduled to be produced in the furnaces was correctly computed as the total desired billet weight, plus the standard allowance for scrap occuring in the furnace department in the pouring of the ingots through splashing, loss in slag, and other such causes. Thus, no blame could be laid at the door of the scheduling department, although as a matter of fact, it was frequently accused of insufficient providing for the mill using the billets.

The analysis proceeded further to observation of actual practices and it soon became evident that the length of the clearing, or final, crop end was considerably in excess of the amount allowed in the standard practice. After eliminat-

ing the possibility that the cross-sectional area of the billet as rolled was less than ordered (which would have resulted in greater length of the rolled product), the only remaining possibility lay in the size of the individual ingots. Although the steel pourers could hardly be expected to admit readily that they were not following standard practice in pouring the ordered height, it was possible to take physical measurements of an adequate sampling of ingots after they were stripped from the mold but before rolling in the mill. This indicated that certain of the steel pourers consistently poured their ingots over the scheduled height and that the loss on "butt" ingots (the last one poured and too short for use) was over standard consistently on the same heats.

Having narrowed the investigation down this far, the course of action to be followed became fairly obvious—to reinstruct the steel pourers to pour to the ordered length and to institute a more effective supervision of this process. However, since the occurrence of off-length ingots was not wholly restricted to certain steel pourers or to specific grades of steel, it appeared to be a good occasion for a complete review of scheduling, mold marking and pouring practices for all grades of steel. These conclusions are stated at the bottom of Exhibit 1. The result was favorable, with both the rolling mill and open hearth showing a pick-up in good product yield. In addition, performance on promised shipping dates to customers improved.

Cost Control — Indirect Labor Cost

Inasmuch as labor costs constitute roughly half of our expenditures today, the control of labor forces is a phase of cost control which cannot receive too much attention. The control of direct labor forces, by which we generally mean those men who operate the equipment processing material or who perform such operations manually, is a relatively simple one, once the standard force requirements for each operating unit or condition are established. Approximately 45 per cent of these forces in the corporation's steel producing divisions are covered by incentive plans and, under such plans, an overstandard force generally cancels out the possibility of incentive earnings. Consequently, everyone concerned, including the workmen themselves, has a very real motive for not exceeding the standard force requirement. The most fertile field for reduction of direct labor cost becomes that of increasing productivity of the machines and men—the very intent and purpose of the incentive plan installations. Indirect labor forces, on the other hand, represent a somewhat different problem, because there is less of a tendency on the part of supervisors to relate them

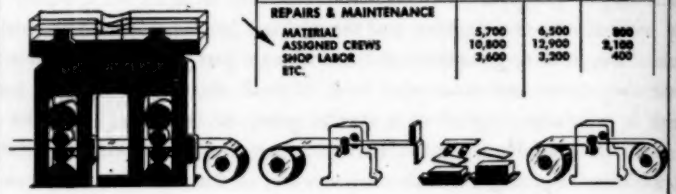
directly to mill operating requirements. Rather, they are usually scheduled according to the backlog of work on hand to be done or expected to occur. Although, on the face of it, this appears to be a reasonable method by which to schedule these forces, it leaves much to the judgment of the supervisor and lacks the characteristic of a controlled use of productive forces.

The largest categories within the indirect labor force in our company probably comprise the maintenance and the material handling forces. Maintenance workers are, in turn, grouped as to those who are part of the centralized maintenance shop crews and those who work in small decentralized groups each of which is regularly assigned to a specific group of facilities. The work done by the more specialized shop crews is done on shop orders entered by the responsibilities requiring the maintenance work, so that there is a dual cost control problem involved. The maintenance shop supervisor must concern himself with keeping his labor force trimmed to the amount of work at hand to minimize idle time and the ordering responsibility must keep its writing of shop orders within its budget for this type of expense. Standards aid in maintaining control over expenditure rates for both of these. The shop foreman can determine the total working force which he will be budgeted for in relation to the total saleable hours which his shop is furnishing to other responsibilities. The operating or service responsibility foreman ordering shop services can predict the amount of maintenance services which his budget will allow him for a current period, assuming that the operating schedule for the period is predictable with a fair degree of accuracy.

The example chosen to illustrate a control problem and its solution in this area involves the use of assigned maintenance forces which are provided for routine inspection and maintenance of operating facilities not involving specialized skills and tools available only in the central maintenance shops. The problem is set forth in Exhibit 2. The size of the crew is generally large enough to take care of all such routine work, although it may be supplemented at any time by central shop maintenance workers if a specific task is too large for the assigned crew. The example assumes that a crew of seven maintenance workers has been determined as the standard requirement for a group of facilities comprising a temper mill, two shear lines and two side trimmer-recoilers. Under conditions considered normal at the time of the establishment of this standard, the flow of material—in this case cold reduced steel strip for tin plate—was through the temper mill, then partly to the shear and partly to the side trimmers, in proportions which would utilize all four units to capacity. Product mix changes subsequent to the installation called for an increase in output of side-

PROBLEM: EXCESSIVE ASSIGNED MAINTENANCE CREW EXPENSE

TEMPER MILL, SHEARS, SIDE TRIMMER RESPONSIBILITY			
COST ITEMS	STD. PRACT. BUDGET	ACTUAL COST	COST VARIANCE
REPAIRS & MAINTENANCE			
MATERIAL	5,700	6,500	800
ASSIGNED CREWS	10,800	12,900	2,100
SHOP LABOR	3,600	3,200	400
ETC.			



ANALYSIS DISCLOSES:

1. **STANDARD CREW=7 MEN AT FULL OPERATIONS**
2. **DEPARTMENTAL OPERATING SCHEDULE ALTERED DUE TO PRODUCT MIX CHANGES.**
3. **SCHEDULE HAS PROVIDED FOR A 2-MAN CREW ON EXTRA TURNS WHEN SIDE TRIMMERS ONLY ARE OPERATING, FULL CREW OF 7 MEN ON ALL OTHER TURNS.**

PROBLEM: EXCESSIVE ASSIGNED MAINTENANCE CREW EXPENSE

ASSIGNED MAINTENANCE CREW FORCE REQUIREMENTS AT VARIOUS OPERATING LEVELS

NO. OF UNITS OPERATING			NO. OF* MEN REQUIRED
TEMPER MILL	SHEARS	SIDE TRIMMER	
1	2	2	7
1	2	1	6½
1	2	–	6
1	1	2	5¾
1	1	1	5¼
1	1	–	4¾
1	–	2	4½
1	–	1	4
1	–	–	3½
–	2	2	3½
–	2	1	3
–	2	–	2½
–	1	2	2¼
–	1	1	1¾
–	1	–	1¼
–	–	2	1
–	–	1	½

*USE NEAREST WHOLE VALUES FOR FRACTIONAL VALUES

CONCLUSION: CHANGES IN LEVEL OF OPERATIONS SHOULD BE REFLECTED IN CREW SCHEDULING. REQUIREMENTS FOR EACH OPERATING LEVEL CHARTED PER BASIC STANDARDS FOR USE AS GUIDE.

OPERATING SCHEDULES INVOLVING FRACTIONAL MAN-TURN REQUIREMENTS ARE AVOIDED WHEN POSSIBLE. TEMPORARY ACCUMULATIONS OF MAINTENANCE WORK ABOVE CAPACITY OF STANDARD ASSIGNED CREW DONE BY CENTRAL SHOP LABOR.

RESULT:

VARIANCE SUBSTANTIALLY ELIMINATED.

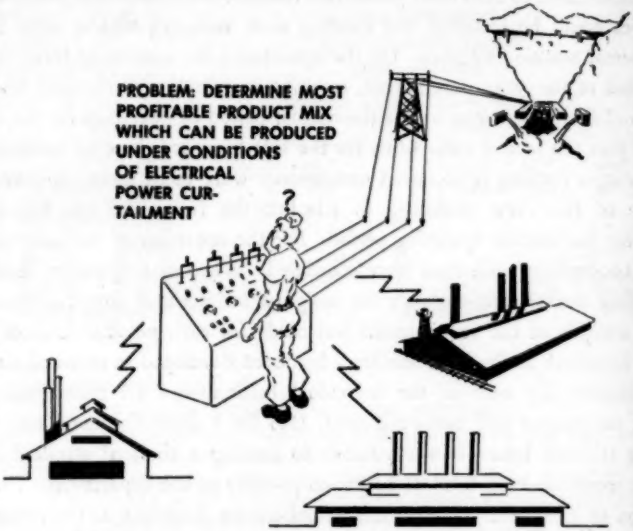
EXHIBIT 2

trimmed coils, with a corresponding decrease in the output of sheared plate. This meant that, to hold total production constant until additional side-trimming facilities could be installed, the existing units were required to work beyond the normal working schedule. On the other hand, the number of turns required per week of the shear were halved, resulting in operation of the mill, one shear line, and both side trimmers for the normal period of operation for the department, plus the several extra turns for the side trimmers alone on weekends.

Having a backlog of deferred maintenance work to be done, the foreman in charge of this crew continued to schedule the full seven-man maintenance crew for the normal operating period. For the operation of the side trimmers only, two maintenance men were scheduled. When this operation resulted in a chronic unfavorable variance for assigned maintenance crews, a more thorough analysis of the requirements was made for each possible level of operation. Inasmuch as the basic standards had been developed in terms of man-hour requirements for each of the individual facilities—as 3.5 maintenance man-hours per temper mill operating hour, 1.25 for a shear line hour, and 0.5 for a side trimmer hour—it was possible to develop a chart of standard maintenance crews for each level of operation possible in the department. The lower portion of Exhibit 2 expresses this. Furthermore, inasmuch as the maintenance foreman had agreed to the original standards as being equitable, he now agreed to adhere to the standard crew schedule except in case of emergency, making up such deficit as might occur in maintenance work by use of central shop labor. As soon as this principle of scheduling became established, any tendency on the part of the maintenance workers to "stretch out" the work became relatively pointless, since their working schedule was determined by the schedule of the operating units rather than the amount of maintenance work which might be advisable to undertake on a given day.

Profit Control Under Limiting Factors

The foregoing two examples illustrate the use of standards in current cost control. They suggest various methods by which material and labor force utilization may be accurately measured after the fact and, also, by which current and even future scheduling may be kept within acceptable limits. These important, orthodox uses of standard costs by no means mark limits. The importance of proper expression of costs and profits for the specific problem requiring action, one of the concepts already briefly mentioned, implies other uses which may be illustrated. The example now to be presented may appear to be a rather far-fetched use for the standard costing method but, strangely enough,


PROBLEM: DETERMINE MOST PROFITABLE PRODUCT MIX WHICH CAN BE PRODUCED UNDER CONDITIONS OF ELECTRICAL POWER CURTAILMENT
?

ANALYSIS DISCLOSES: POWER SHORTAGE REQUIRES THAT WORKS LIMIT ELECTRICAL ENERGY CONSUMPTION TO 4000 MKWH PER MONTH VERSUS NORMAL USAGE OF APPROX. 6000 MKWH.
BUSINESS LEVEL IN SELLER'S MARKET, PERMITTING SELECTIVITY BY PRODUCER.

DATA AVAILABLE IN BASIC STANDARDS:

1. **ELECTRICAL ENERGY USAGE PER OPERATING HOUR, BY FACILITY.**
2. **PRODUCTION PER OPERATING HOUR BY FACILITY, BY PRODUCT.**
3. **MATERIAL REQUIREMENTS FOR SUCCEEDING PROCESSING STAGES.**

SOLUTION:	(A) STANDARD NET TONS/ MKWH	(B) CURRENT PROFIT/ NET TON	(C) CURRENT PROFIT/ MKWH	(D) RANKING BY PROFIT /MKWH	(E) CURRENTLY AVAILABLE BUSINESS	(F) MKWH/MO. REQUIRED FOR (E)
PRODUCT A	10.310	$ 7.530	$77.634	3	5100 T	495
PRODUCT B	6.135	15.137	92.865	1	2000	325
PRODUCT C	3.483	24.082	83.878	2	5800	1665
PRODUCT D	2.882	12.718	36.653	4	6700	2325
PRODUCT E	3.145	8.274	26.022	6	3100	985
PRODUCT F	1.862	17.917	33.361	5	600	325
TOTALS	——	$14.491	——	—	23300 T	6120

CONCLUSION: ACCEPT ORDERS ONLY FOR PRODUCTS A, B, C, AND SELECTIVELY FOR D, AND SCHEDULE PRODUCTION SO AS NOT TO EXCEED ELECTRICAL DEMAND LIMITATIONS.

EXHIBIT 3

just such a use was made of standards at one of our plants during a hydro-electric power shortage some years ago. The example, formulated in Exhibit 3, assumes that the plant affected by a shortage of electric power is composed of several departments which produce, in all, six identified products, A through F. Normal power usage of the plant operating at capacity is at the rate of approximately 6,000 m.k.w.h. per month. However, in line with the reduction of power availability to all industries in the region, a limitation of 4,000 m.k.w.h. has been imposed as a maximum monthly usage. The problem is to determine the tonnage and mix of products which can be produced at the greatest potential profit with the available power supply. In analyzing this situation, it becomes evident that two factors are controlling in the proper solution of the problem. These are that the profit margin is generally highest for products which undergo the greatest amount of processing and that these products are more often than not the greatest users of electrical power. However, this relationship is far from a well correlated one. On one hand, certain of the products involving a high degree of finishing activity may be more subject to local competitive influences than the product line in general and, consequently, earn a rather low profit in terms of power consumed. On the other hand, a product earning a relatively low rate of profit in terms of total expense or sales dollars may, due to the fact that it is produced largely by manual methods—as for instance castings in a job foundry—have a favorable profit per m.k.w.h. ratio.

The solution to the problem is found in the standard usage of electrical energy which is established for each responsibility cost in our cost system where it is at all significant and is usually expressed in terms of m.k.w.h. per standard operating hour of the equipment. This is true of service responsibilities as well as of operating responsibilities and the usage of power in these cost centers is readily relatable to the operation of the producing responsibilities at standard. This is possible because each service responsibility's total activity is allocated to the using responsibilities at standard and the service's electrical power consumption may be assumed to follow the usage of the service function. Through use of standard material input factors, the cumulative use of energy through the various stages of processing is developed and, finally, through use of the standard production time rates for the various processes, it is possible to determine the total cumulative use of electrical power per unit of finished product. As assumed in the data displayed in Exhibit 3, a quite wide variation in consumption exists between the products which are the high and low users of power, Product A being hardly more than a semi-finished product while Product F requires many intricate stages of processing.

The current profit ratio, probably at the standard gross profit level, is then

set beside the net ton per m.k.w.h. consumed factor. Multiplying these two ratios for each of the identified products derives the profit per m.k.w.h., the proper expression of profit as defined at the outset. A ranking of the products in order of desirability, as indicated in Column D of the exhibit, differs markedly from the profit per net ton in Column B. The remainder of the computation then consists of determining through the sales department the maximum market for the various products (up to, but not exceeding, the capacity to produce each of the products). The power requirements for each may then be computed for this volume, and a determination made as to how far down the product ranking we may go before the available power is consumed. We find in this case that Products A, B, and C may be produced to the limit of current demand and that roughly two-thirds of the tonnage of Product D may also be produced before the power is curtailed. This is expressed in the statement at the bottom of Exhibit 3.

As in the other examples, the many ever-present complicating factors of customer relations, labor relations, difficulty of such selective scheduling, and other such items have been ignored. The wide variety of items in our product line would result in some impractical conditions in application of the results of this study, due to insufficient machine loading to justify scheduling crews where only small tonnages of certain items appear in the desirable category of the ranking. However, the importance of the example is to make it clear that the bulk of standards data is usable not only in theory but increasingly—as we become more familiar with what potential there is in the system—for guidance in the decision-making function.

Profit Control — Premium Material Programs

Among the terms in common use in the steel industry one of those more frequently heard is "completely integrated facilities." As applied to a steel works, this is generally understood to mean that all of the basic processes from the receipt of primary raw materials to the shipment of finished steel products are gathered into one self-contained unit. In a strictly literal sense, it further implies that the capacities of the various facilities are so interrelated that at normal operation there need be no supplementation of semi-finished material from outside source, nor any surplus of semi-finished material at any point in the process which will require disposition. In actual fact, however, complete integration in this sense of balanced material flow is seldom if ever achieved, and the term is applied to all works which have the complement of facilities necessary to the complete cycle of steel-making, and which are in reasonable

balance as regards capacity ratings of the various facilities. Even in the so-called completely integrated works, there are almost always several points at which there is a deficit or an excess of semi-finished products when the plant is operating at full capacity. This sort of imbalance also comes about because finishing facilities—secondary rolling mills, wire mills, sheet and tin mills and similar units—are frequently deliberately installed with greater capacities than the associated primary producing facilities can produce in the form of ingots.

As a result of this situation, the periods of operation at full rated capacity which we have experienced in the last decade have presented many possibilities for the enhancement of profits through the acquisition of supplementary tonnages of semi-finished products—generally from nonintegrated producers with excess furnace capacity—and, in this way, to make fuller utilization of the finishing mills to increase total sales. This sort of proposition generally looks good to everyone concerned. The company furnishing the supplementary tonnage is enabled to make a profit on product which it otherwise cannot market, lacking the capacity to put it into finished form. The sales department of the firm acquiring the tonnage is delighted to be able to furnish a bonanza to its customers. People concerned with mill operations always welcome the opportunity to cram a little more steel through the mill.

However, the economics of the propositions are not always right. A careful evaluation is usually required. The example now to be given, with particulars as in Exhibit 4, is a rather simplified form of such an evaluation. The example assumes that excess finishing capacity is available for rolling billets into bar products, and that the deficit tonnage can be acquired from either of two sources at delivered prices which differ in the amount of seven dollars per net ton. Additionally, it was developed that, due to limitations of the equipment producing billets at Source B, any tonnage acquired from this source will require inspection and surface preparation in the amount of two dollars per net ton. Operating the mill to process any additional tonnage will involve certain abnormal expenses out-of-pocket such as overtime payments to man the mill beyond normal schedules, supplementary and more expensive fuels above those available from own sources, etc. The cost effect per ton of finished product of all of these items may be readily and accurately evaluated through the use of existing standards, once the physical requirements are established (and even for this determination the standards provide most of the necessary keys.)

Having evaluated these aspects, a comparison is drawn of the total premium cost required to convert the billets from both sources, with the sum of the normal profit on bar products plus the fixed or marginal expense. This reveals that only by using billets from source A can the ultimate total profit be im-

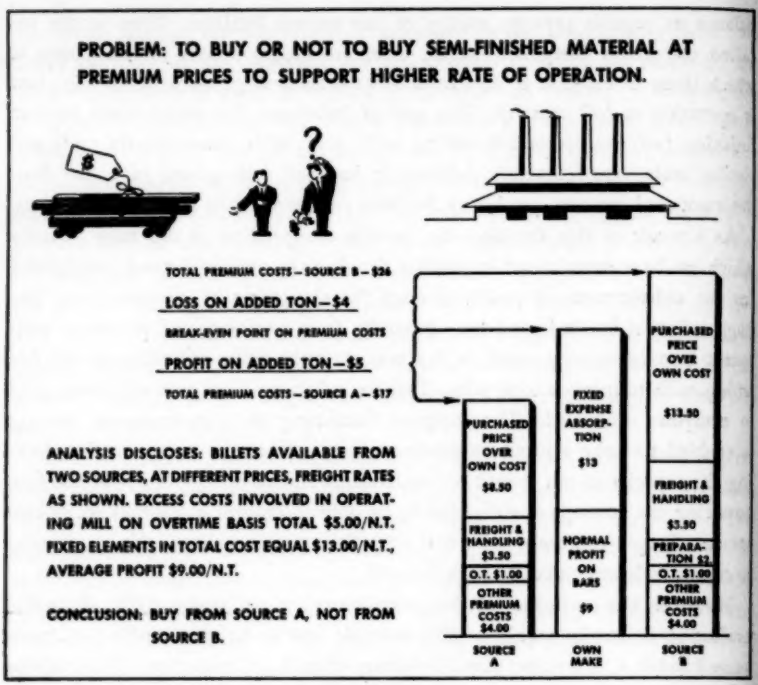

PROBLEM: TO BUY OR NOT TO BUY SEMI-FINISHED MATERIAL AT PREMIUM PRICES TO SUPPORT HIGHER RATE OF OPERATION.
TOTAL PREMIUM COSTS – SOURCE B – $26
LOSS ON ADDED TON – $4
BREAK-EVEN POINT ON PREMIUM COSTS
PROFIT ON ADDED TON – $5
TOTAL PREMIUM COSTS – SOURCE A – $17
ANALYSIS DISCLOSES: BILLETS AVAILABLE FROM TWO SOURCES, AT DIFFERENT PRICES, FREIGHT RATES AS SHOWN. EXCESS COSTS INVOLVED IN OPERATING MILL ON OVERTIME BASIS TOTAL $5.00/N.T. FIXED ELEMENTS IN TOTAL COST EQUAL $13.00/N.T., AVERAGE PROFIT $9.00/N.T.
CONCLUSION: BUY FROM SOURCE A, NOT FROM SOURCE B.
PURCHASED PRICE OVER OWN COST $8.50
FREIGHT & HANDLING $3.50
O.T. $1.00
OTHER PREMIUM COSTS $4.00
SOURCE A
FIXED EXPENSE ABSORPTION $13
NORMAL PROFIT ON BARS $9
OWN MAKE
PURCHASED PRICE OVER OWN COST $13.50
FREIGHT & HANDLING $3.50
PREPARATION $3
O.T. $1.00
OTHER PREMIUM COSTS $4.00
SOURCE B

EXHIBIT 4

proved. Therefore, Source B is eliminated from consideration. The existence of basic and dollar standards for all aspects of this operation enabled a quick evaluation with a minimum margin of error.

Profit Control — Price Recommendations for New Products

A further important use of standard costs is in the development of price recommendations for new products. Nowadays, probably more than ever before —due to pressure of competing materials such as light metals and plastics— we are constantly searching for means to extend the product line profitably. This may be done by adding new variations to existing product lines, such as the tie plate section in the example now to be discussed, or by adding entirely new products. In either case, the framework of the standard cost system enables the development of product cost quickly and accurately, to be used as the basis for the price recommendations.

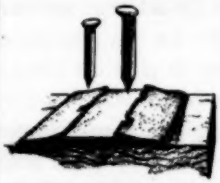
In developing such a recommendation for the tie plate section #15B, illustrated in Exhibit 5, we find that standard values in ingot form for the type of steel required are established as part of the system. In addition, the standard operating cost per hour is available in the system for the two principal operations—the rolling mill which converts the ingot into tie plate bar (long strips with the cross-sectional area required in the finished tie plate) and the tie plate punch which shears the bar into the desired lengths and punches the spike holes. Finally, the standard cost of such items as rolls in the mills and punches and dies in the tie plate machine are already established at standard in terms of cost per net ton processed, since these items of cost are consumed only when production is actually under way rather than with the passage of time. To proceed with the evaluation, however, will require the development of some new data, in this case basic standards for material loss and production time in the two operations. This is accomplished by the industrial engineers. The availability of basic standards for closely similar sections already being produced both simplifies this development and provides checks for reasonableness of the new standards.

Having established these basic standards for the new section and with the standard values for material and operating time already available, the translation of the basic standards into dollar values and ultimately to product costs proceeds rapidly, along the lines of Exhibit 5. At the conclusion, a fairly complete and comprehensive report describing the product and the practice necessary for its production, and with a product cost development which is straightforward and uncluttered, is available to those responsible for quoting a price. Again, the standard cost framework is ideally equipped for such developmental work and provides the necessary facts for making the decision with accuracy and speed.

Profit Control — Selective Sales Analysis of Bar Products

Standard costs are frequently used in formulation of management decisions in the field of selective analysis of profit margins of products in various sizes or types within a general line of products. The maintenance of a reasonably consistent and favorable cost-sales price relationship over a very wide range of products is at least as difficult and, I feel certain, more difficult in the steel industry than in most large-volume industries. In general, steel products are priced through the application of a price base for each product plus extras which recognize cost differentials resulting from gradations of size, coating weight, quality of steel, and many other similar factors. Each rolling mill or

PROBLEM: DEVELOP PRICE RECOMMENDATION FOR NEW PRODUCT TIE PLATE SECTION AREA #158–C.B. & Z. R.R. CO.



DATA AVAILABLE IN STANDARDS

1. INGOT COST BY STEEL GRADE REQUIRED.
2. STANDARD ROLLING MILL OPERATING COST/HOUR FOR COSTS RELATED TO TIME.
3. STANDARD ROLLING MILL OPERATING COST/NET TON FOR COSTS RELATED TO NET TONS.
4. STANDARD TIE PLATE PUNCH OPERATING COST PER HOUR AND PER NET TON.

DATA REQUIRED FOR COST DEVELOPMENT:

1. YIELD, INGOT TO TIE PLATE BAR
2. NET TONS PER ROLLING MILL OPERATING HOUR
3. YIELD, TIE PLATE BAR TO PUNCHED (FINISHED) TIE PLATE
4. NET TONS PER HOUR—PUNCHING & SHEARING

BASIC STANDARDS
BLOOMING AND BAR MILL

METAL LOSS STANDARDS	UNITS	TIE PLATE BAR SECTIONS				
		AREA #7	AREA #9	AREA #10	AREA #13	AREA #158
SCALE LOSS—FURNACE & MILL	PERCENT OF FIN. PRODUCT	.0230	.0221	.0221	.0221	.0221
CROP, COBBLE & REJECT LOSS	"	.1087	.1020	.0954	.0982	.1002
TOTAL LOSS	"	.1418	.1241	.1175	.1203	.1223

PRODUCTION TIME STANDARDS	UNITS	AREA #7	AREA #9	AREA #10	AREA #13	AREA #15
SCHEDULED DELAYS	MILL OPER. HOURS PER NET TON	.0017	.0018	.0018	.0015	.0018
ROLLING & UNSCHEDULED DELAY TIME		.0241	.0250	.0244	.0237	.0245
TOTAL OPER. TIME		.0258	.0268	.0262	.0252	.0263

TYPICAL COST—SALES PRICE DEVELOPMENT
TIE PLATE PRODUCT

SPECIFICATIONS & PRACTICE:
C.B. & Z. R.R. TIE PLATE AREA #158

TIE PLATE BAR PRODUCED ON 26"-18" MILL
PROD. RATE—38.0 N.T./HR.
YIELD FROM INGOT—89.10%

TIE PLATE PUNCHED ON PUNCH #3
PROD. RATE—7200 PLT./TURN
YIELD FROM BAR—93.00%

CUST. DRG. NO.—623-40
OUR DRG. NO.—PTP-137

WEIGHT/PC.—5.070#
END USE—60# RAIL

BUNDLING—8-10, WIRED

PRODUCT COST DEVELOPMENT DATA

PROCESSES	MATERIAL & CONVERSION COSTS			
	STD. YIELD	COST OF LOSS	COST ABOVE	TOTAL COST
INGOTS—GRADE 251				61.653
TO TIE PLATE BAR	89.10	4.862	9.323	14.185
TO				
TOTAL ABOVE PROCESSES		4.862	9.323	14.185
PROCESSES BELOW		6.340	25.991	32.331
TOTAL MFG. COST (EXCL. GMO)		11.202	35.314	108.169
GROSS MATERIALS USED:	UNITS/ N.T. PROD.	UNIT	PRICE OF UNIT.	COST/N.T. PRODUCT
TIE PLATE BAR	1.0753	NET TON	75.838	81.549
TOTAL GROSS MATERIALS	1.0753		75.838	81.549
SUNDRY PRODUCTS RECOVERED				
SCRAP	.0753	NET TON	24.000	1.807
TOTAL SUNDRY PROD. RECOVERED				1.807
TOTAL NET MATERIAL COST				79.742
TOTAL COST ABOVE MATERIALS				25.991
TOTAL MANUFACTURING COST (EXCL. MILL OVERHEAD)				105.733
MILL OVERHEAD (DETAIL SUPPLIED)				8.168
TOTAL STANDARD MILL COST				113.901
TOTAL SHIPPING EXPENSE				.207
TOTAL STANDARD F.O.B. MILL COST				114.108
SELLING & ADMINISTRATIVE COST				6.043
TOTAL COST OF SALES AT STANDARD				120.151
PROFIT OBJECTIVE (10% BEFORE FEDERAL & STATE INCOME TAXES)				13.351
SALES PRICE REQUIRED TO RETURN PROFIT OBJECTIVE				133.501

RECOMMENDATION TO SALES DEPARTMENT—QUOTED TOTAL PRICE INCLUSIVE OF APPLICABLE EXTRAS SHOULD EQUAL OR EXCEED $6.675/CWT.

EXHIBIT 5

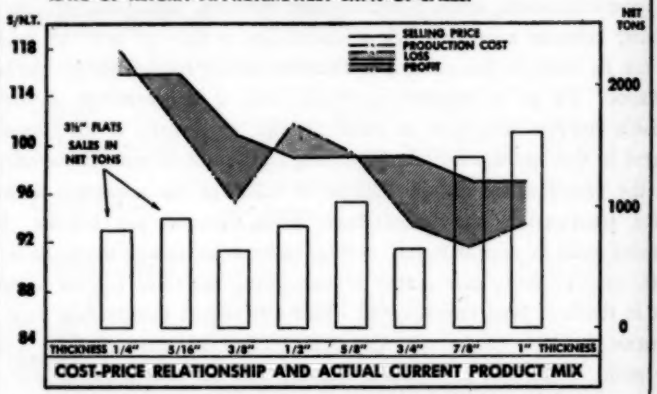
wire drawing machine or other equipment has its own optimum range of products. We frequently find that within a product group embracing a range of sizes, the cost-sales price relationship varies quite considerably. A typical example of such a situation is in Exhibit 6, using hypothetical data for a range of thicknesses for 3½" flats, a merchant bar product. The detail available in the standards enables us to develop standard product costs for each thickness produced which, when plotted against the total sales prices for the same products, indicates a decided lack of correlation in the ½" and ⅜" thickness. This can be traced to the element or elements of cost responsible for the lack of correlation. To do so requires, generally, only a cusory review of the basic standards for operating time or metal practice, particularly if the condition is inherent in the operation of the producing equipment or practices in effect.

In the example, we see the volume of sales for the respective thicknesses studied, portrayed by the vertical bars. From these we see that the "losers" are being sold in approximately average volume as among the various thicknesses, the ⅜" item, as a matter of fact, being the third highest among the eight in terms of total tonnage sold. This was in part the result of lack of information available to the sales department as to the reason for the relatively poor profit of the line as a whole, namely, that the poor showing was due to several unprofitable sizes rather than just a low profit margin throughout the range. With such data as these in hand, however, the sales people may revise prices or evaluate the possibility of applying sales effort toward altering the product mix sold, to achieve a positive and favorable result on the overall profit margin, such as is indicated in Exhibit 6. Of course, the extent to which the sales staff can alter the product mix will vary considerably. Demand of customers frequently makes it necessary that a full product line be furnished, even though some individual items in the product line may not, in themselves, return a satisfactory profit.

None of these observations is original, nor do we claim that standard costing is the only system which will enable good control of the problem. However, the standard cost system is ideally equipped to provide the comparative data which makes such sales analysis studies possible. In most cases, it is not necessary to make a study of this type for more than a limited period of time, for, having established the fact that improvement is needed in a given area, a "one-time" analysis at the standard gross profit level is generally sufficient to indicate the trouble spots. Moreover, the comparisons which may be drawn at this level in a study of this kind are seldom altered by proceeding through variance association to actual gross profit or net profit levels, since the variances incurred usually are associable fairly equally. However, if there is firm

PROBLEM: ATTAIN MAXIMUM PROFIT POTENTIAL FROM LINE OF MERCHANT BAR PRODUCTS – 3½" FLATS – ¼" TO 1" THICKNESSES.

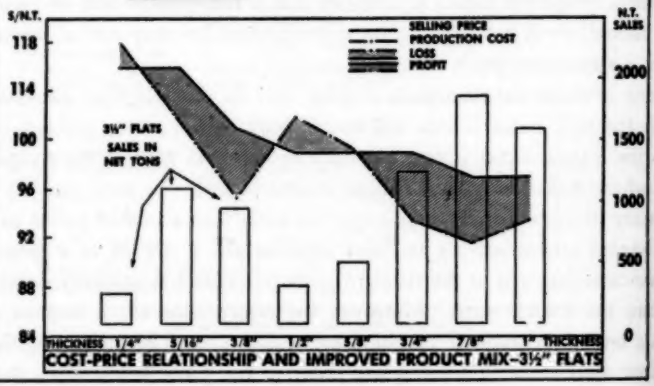
ANALYSIS DISCLOSES: SELLING POLICY HAS NOT BEEN SELECTIVE IN RESPECT TO SIZE OF SECTION. COST OF PRODUCTION OF VARIOUS SIZES DOES NOT VARY PROPORTIONATELY WITH SELLING PRICES, RESULTING IN WIDELY VARYING PROFITABILITY BY SIZES. CURRENT RATE OF RETURN APPROXIMATELY 5.17% OF SALES.



COST-PRICE RELATIONSHIP AND ACTUAL CURRENT PRODUCT MIX

CONCLUSIONS: WITHIN LIMITS OF GOOD SALES POLICY, HOLD ACCEPTANCE OF 3½" FLATS IN ¼", ½" & 5/8" THICKNESSES TO MINIMUM POSSIBLE TONNAGE. ACCEPT ALL OTHER THICKNESSES, CONCENTRATING ON ¾" AND 7/8" THICKNESSES. DETERMINE WHETHER IMPROVEMENTS IN ROLL AND PASS DESIGN, MILL OPERATING PRACTICES, INCENTIVE RATES OR OTHER FACTORS MAY BE MADE TO IMPROVE PROFITABILITY OF LOSING ITEMS.

RESULT: IMPROVED PRODUCT MIX RETURNING 8.06% PROFIT ON SALES. STUDY TO BE CONTINUED TOWARD IMPROVED PROFITABILITY.



COST-PRICE RELATIONSHIP AND IMPROVED PRODUCT MIX–3½" FLATS

EXHIBIT 6

reason for believing that this is not the case, the result of the more thorough-going analysis is still, in our opinions, quite preferable to anything which may be obtained using historical costs.

Studies of this type have particular value in connection with product lines in which very slight differences in various characteristics are recognized, resulting in great numbers of identified products, each of relatively small volume. Under these conditions, the study frequently uncovers items for which extras charged in the price are wholly inadequate for the processing cost which should be recovered or items which the available equipment simply cannot produce efficiently or other such out-of-line situations involving products furnished to only one or at most a limited number of customers. For these, the extra may be revised to an adequate amount or the product eliminated from the line, without significant damage to customer relations and, frequently, with quite a significant favorable effect on overall profit margins. At the very least, analyses of this type put the sales department on notice that acceptance of orders for certain specific items is of questionable—although measurable—value and also demonstrates to operating management that there are some economic "holes" in its structure which should be plugged up by acquisition of more efficient facilities or improvement of existing practices.

Appropriation Study — New Facilities

The preparation of requests for appropriations for capital expenditures offers yet another fertile field for application and use of standard costs in making management decisions. This field of endeavor is largely one of cooperative effort among engineering, accounting, industrial engineering, market research, and other staff groups. In this work, standard product costs are used to evaluate the gains in profit which increased production or productivity may offer. Basic standards for materials are used to determine changed material requirements with altered or new facilities. Standard operating costs are used in determining the extent of financial changes expected to occur due to appropriation expenditures.

Where new facilities of a type not used in the operation before are involved, applicable basic and dollar standards are not, of course, immediately available. However, as pointed out previously in the development of the product cost for an additional tie plate section, the prior existence and availability of standards for similar equipment or processes provides a point of departure from which the new determinations may more readily be made and, additionally, frequently

PROBLEM: DETERMINE ECONOMIC FEASIBILITY OF INSTALLING ORE CRUSHING AND GRADING FACILITIES TO IMPROVE BLAST FURNACE PRODUCTION AND COSTS.

ANALYSIS DISCLOSES: ENGINEERING STUDIES AND EXPERIENCE OF OTHER PLANTS INDICATES THESE POTENTIAL BENEFITS:

1. INCREASE IN PRODUCTION 27 NET TONS/DAY
2. DECREASED COKE REQUIREMENTS/NET TON IRON
3. DECREASED FLUX REQUIREMENTS/NET TON IRON

SUMMARY OF FINANCIAL CHANGES
ORE CRUSHING AND GRADING FACILITIES

	PRESENT FACILITIES	PROPOSED FACILITIES	CHANGE (ANNUAL BASIS)
GAINS DUE TO INCREASED OUTPUT			
ANNUAL PRODUCTION	336,300 N.T.	343,615 N.T.	9,315 N.T.
PROFIT ON ADDED SALES @ 2.75/N.T.	——	$25,600	$25,600
GAINS DUE TO IMPROVED COSTS:			
ORE GRADING PROPORTIONS + 3"	46%	0%	—46%
ORE GRADING PROPORTIONS 3" TO + ¼"	22%	65%	+43%
ORE GRADING PROPORTIONS ¼" AND MINUS	32%	35%	+ 3%
MATERIAL COST AT FURNACE:	$/N.T. $ AMOUNT	$/N.T. $ AMOUNT	
METALLIC MIXTURES	14.371 4,833,000	14.414 4,847,900	$(14,900)
FURNACE COKE	9.287 3,123,300	8.952 3,007,400	115,800
FLUXING STONE	.313 105,300	.303 101,800	3,500
TOTAL GAIN—MATERIAL COST	— 8,061,500	— 7,957,100	$104,400
SUB-TOTAL GAINS (ADDED PROFIT AND COST IMPROVEMENT)			$ 130,000
LESS: CRUSHER AND GRADER OPERATING COSTS		$17,000	
INCREASED DEPRECIATION & PROPERTY TAXES		9,600	
TOTAL ADDED COSTS			26,600
ANNUAL BENEFITS BEFORE INCOME TAXES			$ 103,400
LESS FEDERAL AND STATE INCOME TAXES			53,800
NET ANNUAL INCREASE IN PROFITS			$ 49,600
TOTAL EXPENDITURES IN PROPOSAL			187,000
PER CENT RETURN ON INVESTMENT			26.5%
YEARS TO RECOVER INVESTMENT			3.2

CONCLUSION: ACQUIRE PROPOSED FACILITIES

EXHIBIT 7

provide a check on the reasonableness of any new standard developed. The ease with which evaluations may be made of several possible alternatives in developing plans for new or changed facilities may also eliminate the necessity for expensive studies before they are commenced, by demonstrating that the propositions are so economically unfeasible, even on a fairly rough determination, that further consideration of them is impractical or, possibly, that the desired objective may be attained without new facilities.

For an example illustrating the use of standards in praparation of appropriation requests and also in the follow-up reports to determine the actual benefits derived, we have assumed a situation (Exhibit 7) in which it is proposed that facilities be installed for crushing and grading ore to charge into a blast furnace. It is claimed that productivity will be enhanced and other material costs reduced through the favorable effect on the smelting process which will result from the more uniform and properly sized furnace charge. Since the furnace is a merchant iron producer and presumably is in a position to dispose of its total output, there will be a direct gain in total profits through increased sales, as well as the gain from reduced material costs of operation. No other benefits are to be claimed in this request, since possible improvements in cost per ton of labor and services will probably be offset by increases in the cost of operating certain auxiliary equipment at the higher level of output. Therefore, the basis of the request lies in the three anticipated benefits listed in Exhibit 7: (1) that iron production will be raised 27 net tons per day, (2) that requirements of coke will be reduced due to the greater efficiency of the resultant smelting process, and (3) that requirements of fluxing stone will similarly be reduced. These determinations are based on engineering studies and available experience and will immediately constitute new basic standards for the furnace when the facilities come into operation.

With these facts and figures in hand, plus the standard values relating to all aspects of the operation as currently conducted, a summary of financial changes is readily drawn up. The anticipated gain in profits is computed, using the current standard product cost and the gain due to lowered material cost is evaluated precisely, using current material practice standards versus anticipated, both at established standard prices for the three basic materials. Standard rates for labor, services, utilities, etc. are used in calculating the operating costs of the new equipment. The development of financial changes proceeds logically from these to the determination of per cent return on investment and years required to recover investment. Since these are favorable in the example, the decision is to acquire the facilities, as the lower portion of Exhibit 7 discloses.

SUMMARY REPORT OF ACTUAL VERSUS ANTICIPATED FINANCIAL CHANGES RESULTING FROM CAPITAL EXPENDITURES

APPROPRIATION: ORE CRUSHING AND GRADING FACILITIES
REPORT PERIOD: 3rd QUARTER, 1952

ITEM	SCHEDULED	ACTUAL
APPROPRIATION COMPLETION DATE	MARCH 1952	APRIL 1952
EXPENDITURE — PROPERTY	$ 179,600	$ 180,500
— OTHER	7,400	5,100
— TOTAL	187,000	185,600
ANNUAL SAVINGS (AFTER TAXES)	49,600	42,300
% RETURN (TOTAL EXPENDITURES)	26.5%	22.8%
YEARS TO RECOVER INVESTMENT	3.2	4.4

	BEFORE INCOME TAXES	AFTER INCOME TAXES
EXPECTED ANNUAL BENEFITS	$ 103,400	$ 49,600
ACTUAL ANNUAL BENEFITS	87,900	42,300
BENEFITS ATTAINED LESS THAN ANTICIPATED	($ 15,500)	($ 7,300)

PRIMARY FACTORS IN ABOVE:

(1) COKE USAGE RATE DID NOT IMPROVE TO EXTENT ANTICIPATED— ($ 18,200)
(2) PRODUCTION RATE INCREASE EXCEEDED ANTICIPATION— $3,300

EXHIBIT 8

However, standard costs have not completed their usefulness in connection with this evaluation, when the decision to acquire the proposed facilities has been made. Once installed, the value of the facilities continues to be scrutinized by alert management for a reasonable period of time to determine whether, in fact, the decision was sound and, if not, why not. Accordingly, a series of reports, generally on a quarterly basis, is issued to detail the benefits actually received against those anticipated and to determine why there is a significant discrepancy, if any. Such a report is illustrated by Exhibit 8. Inasmuch as wages, material, and many other costs may have changed substantially since the original study, the comparison will not be valid unless the current results are adjusted back to the values in effect at the time of the original study. This is made more feasible by the fact that standard values were used in both periods and the variations of actual costs within the subsequent periods may be eliminated from this consideration unless known to be major.

The final use of standard costs in connection with an appropriation study

thus appears in the determination of reasons for failure to gain the anticipated benefits or possibly for gaining greater benefits than originally envisioned. These reasons are generally readily available in the variance analyses which are a very important by-product of any effective standard cost system. Along this line, we find in the example we have been considering that anticipated benefits failed to reach expectations, primarily due to the fact that coke usage did not decline as expected. The value attached to this fact is the product of the difference in actual over standard rate of usage times the standard value of coke. In this phase of cost accounting, then, standard costs aid in making the decision, determine whether the decision was sound or not and, finally, why and to what extent the decision was not sound, if that be the case.

Profit Forecasting

Our final example (appropriately so, since it involves looking off into the future) depicts, as in Exhibit 9, the extensive use made of basic and dollar standards in forecasting. Accurate and intelligent forecasting has come to have a more important position in the affairs of management in recent months and I would venture to guess that with few if any exceptions, the managements of progressive companies are all taking a very earnest look into the months and years to come. Profit forecasting using standard costs proceeds in the conventional manner. It uses, as the starting point, a forecast of sales furnished in a degree of product detail considered adequate for the use to be made of it and developed by the responsible persons within the sales group. This is evaluated at current sales prices to determine the anticipated net sales proceeds, although it is conceivable that, if price changes are known or strongly believed to be imminent for the period under consideration, such changed prices may be used for the evaluation.

At this point, the use of standards enters into the forecast through development of the standard cost of sales. In our company, standard product costs are developed in quite extensive detail, recognizing the best method of producing each at normal volume, with the facilities available. However, this is finer detail than that in which the sales forecast is furnished. Consequently, the evaluation is made using grouped standard product cost rates at the level of detail required. This may vary as a matter of technique from company to company. However developed, we have at this point a standard gross profit which, except for selling, administrative, and sundry expenses, indicates the profit which should be returned at the standard practice method of operation, but unaffected by unusual conditions in the period being forecast.

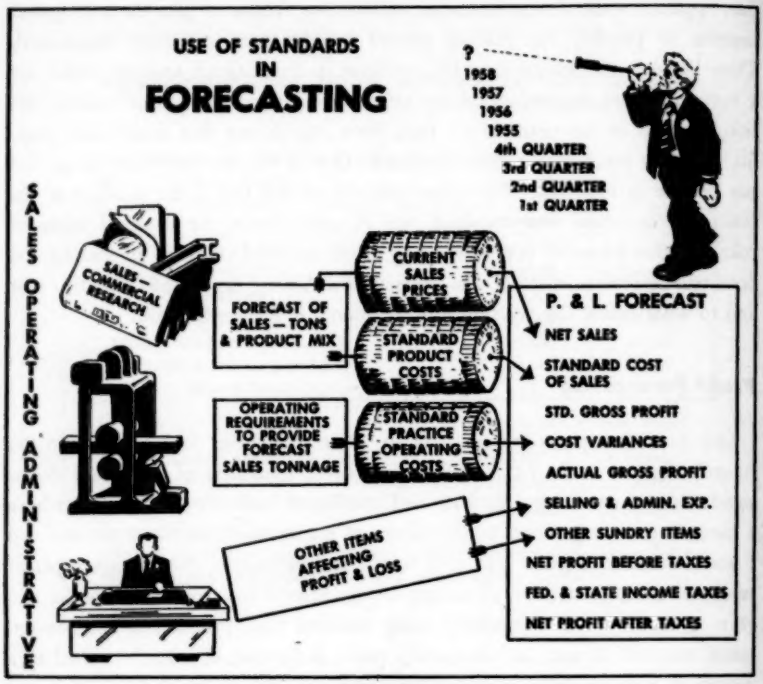


EXHIBIT 9

The translation of the sales forecast into the best plan of operations makes use of basic material input standards to develop material requirements at each stage of processing, after allowance for changes in inventory balances which may be considered desirable. The volume of material flow having been established, reference to basic standards for equipment operating time or for direct labor man-hour requirements for manual operations will establish the required hours and turns of usage of the available men and materials. With these requirements in mind, the gap between standard and actual values is bridged through forecasting of variances. This is essentially a joint effort of the cost accounting staffs directly serving the operating management with the operating people for mill operating costs and with general accounting for overhead costs. Particularly in the forecasting of variances in mill operating costs there must be an intimate knowledge of the basic and dollar standards, of what constitutes standard practice methods of producing the products to be sold, and the prob-

ability of significant acquisitions of materials, fuels, operating tools and supplies or other cost items at values other than those established for each at standard.

With these data in hand, operating cost variances may be developed with reasonable accuracy and the actual gross profit obtained. The use of standards from this point to net profit is rather minor. It should be pointed out that, not only does the use of standards in forecasting provide a rather more logical and orderly development of the various profit and loss statement components than is otherwise necessary, but it also enables a more intelligent analysis of the result by cause and by product. The basic method is the same for any period of time for which a forecast is required.

Conclusion

Although the types of problems which have been discussed here, can be solved without recourse to standard costs, I like to think that standard costs lead operating management to a better understanding of the cost and financial implications of its activities and leads accountants to a better understanding of the operations of the company. In accomplishing this and in providing tools for faster and more accurate evaluations than are otherwise available, standard costing constitutes a solid, sound basis for effective day-to-day accounting service, with many collateral benefits.

I do not propose that companies not already using standard costs or not using them to the extent which we do, immediately establish or further utilize them. I do, however, suggest that it would be wise to determine whether or not the business could be benefited by standard cost techniques or their fuller application. If so, the expenditure of time, money, and effort involved in establishing a successful standard cost system will certainly be repaid. For our part, in United States Steel, except for perhaps an occasional misgiving (since no cost tool is perfect), we are convinced that standard costs enable us to do what we could never achieve with actual costs.

Distribution of Overhead with Electronic Computers

by HARRY T. ASHMAN

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Superseding a procedure under which overhead distribution among service departments dealt with only direct costs (thus introducing inaccuracy into overhead cost distribution at the start), the company furnishing the background for the present study now utilizes advanced electronic equipment for the solution of linear equations applicable to accurate distribution. The story of this conversion is given here for its intrinsic helpfulness and as an instance in the broader area of adaption of electronic equipment to accounting purposes.

ONE OF THE IMPORTANT responsibilities of cost accounting is the correct distribution of expenses among departments or cost centers. The acknowledged correct way to distribute these costs is on a reciprocal basis, in accordance with which the interdepartmental service charges are made among service departments prior to the final allocation to manufacturing and administrative accounts. This is the familiar distribution problem in which, for example, Department A charges ten per cent of its cost to Department B and Department B charges fifteen per cent of its cost to Department A with both transfers being dependent upon concurrent transfer of charges among all other service departments.

The most accurate distribution of overhead among departments or cost centers is by the use of simultaneous linear equations. The exact computation of these equations is tedious and very time consuming. Nevertheless, some companies with few service departments have found the results worth the expense of computing them. However, since most distribution schedules are based upon estimates or averages, exact results are usually not deemed necessary or worth the time and cost to compute them, using conventional office machines. Consequently, many short-cuts or approximate methods of overhead distribution have been developed by cost accountants.

But more capable equipment is now at hand. At Eli Lilly and Company, we have in conjunction with the International Business Machines Corporation, recently developed an overhead cost distribution procedure using the I.B.M. 604 Electronic Computer. Through use of this computer and simultaneous linear equations, this method gives us accurate results and has reduced the time required to compute our monthly overhead distribution from over forty hours to

less than two hours. The purpose of this article is to present in some detail this machine approach to overhead distribution and to discuss its advantages as compared to our previous manual method. It should be noted that the above time estimates cover the computation time only and do not include the time spent on initial planning, board wiring and printing of the final report.

Company Situation and Previous Method

Our problem is that of one of the nation's largest pharmaceutical and biological manufacturers. We have a total of seventy-seven service, fifty-eight manufacturing and over sixty administrative and general expense departments. A typical monthly distribution of overhead involves over fifteen hundred interdepartmental transfer calculations. We have made use of most of the conventional bases of distribution such as floor space, personnel employed, meter readings, total horsepower of machines assigned, etc. Our proration schedules giving effect to these bases are reviewed at regular intervals and adjusted frequently to keep them in agreement with current conditions.

A large portion of utilities used, such as electricity and steam, are produced in our own plant. One of the disadvantages of our previous method of overhead distribution was that production costs arrived at failed to reflect accurately the cost of producing these utilities. This made their comparison to costs of purchased utilities very difficult, if not impossible.

Under our previous method, which involved the use of conventional office machines, we distributed only the direct expenses incurred by our service departments. These direct costs included such items as wages and salaries, employee benefits, repairs and maintenance, miscellaneous expenses, taxes, depreciation and insurance. No transfer of costs were made between service departments prior to allocation of costs to manufacturing and administrative accounts. Under this method, interdepartmental transfers were inaccurate and resulted in charges not being in proportion to the services or utility actually received or rendered. As a result, we were unable to arrive at "true" costs for either service or operating departments, so far as this "truth" relied on overhead distribution procedure.

Solution of Linear Equations in Overhead Distribution

The machine approach requires, like the manual approach, established bases of distribution. As a general rule, the various distribution schedules used under a manual method will supply the necessary information for machine computa-

COMPUTATION OF OVERHEAD DISTRIBUTION
BY USE OF SIMULTANEOUS LINEAR
EQUATIONS

		Incoming Charges From Departments			
Dept. A-Initial Cost	Step	Dept. B(10%)	Dept. C(10%)	Dept. D(10%)	Total Cost
$50,000.00	1	$2,000.00	$4,500.00	$2,250.00	$58,750.00
	2	3,075.00	5,375.00	3,862.50	62,312.50
	12	3,480.96	5,804.75	4,378.88	63,664.59
	13	3,480.96	5,804.75	4,378.88	63,664.59
Dept. B-Initial Cost	Step	Dept. A(5%)	Dept. C(15%)	Dept. D(10%)	Total Cost
$20,000.00	1	$2,500.00	$6,750.00	$1,500.00	$30,750.00
	2	2,937.50	8,062.50	2,575.00	33,575.00
	12	3,183.23	8,707.13	2,919.25	34,809.61
	13	3,183.23	8,707.13	2,919.25	34,809.61
Dept. C-Initial Cost	Step	Dept. A(10%)	Dept. B(15%)	Dept. D(5%)	Total Cost
$45,000.00	1	$5,000.00	$3,000.00	$ 750.00	$53,750.00
	2	5,875.00	4,612.50	1,287.50	56,775.00
	12	6,366.46	5,221.44	1,459.63	58,047.53
	13	6,366.46	5,221.44	1,459.63	58,047.53
Dept. D-Initial Cost	Step	Dept. A(15%)	Dept. B(5%)	Dept. C(5%)	Total Cost
$15,000.00	1	$7,500.00	$1,000.00	$2,250.00	$25,750.00
	2	8,812.50	1,537.50	2,687.50	28,037.50
	12	9,549.69	1,740.48	2,902.38	29,192.55
	13	9,549.69	1,740.48	2,902.38	29,192.55

EXHIBIT 1

tion. However, all schedules, regardless of basis used, must be reduced to percentages so that a standard formula can be established. We saved considerable time by making this preliminary conversion, through the use of the electronic computer.

In order to illustrate the use of simultaneous linear equations and the basic theory used in solving these equations by electronic equipment, a sample problem is offered here, based upon the following facts and conditions:

Dept.	Initial Direct Expense (Estimated)	Basis for Charges to Other Dept.			
		A	B	C	D
A	$50,000.00	—	5%	10%	15%
B	20,000.00	10%	—	15%	5%
C	45,000.00	10%	15%	—	5%
D	15,000.00	15%	10%	5%	—

Equations to be Solved (t = Total Expense)

$A_t = 10\%\ B_t$ plus $10\%\ C_t$ plus $15\%\ D_t$ plus $50,000.00
$B_t = 5\%\ A_t$ plus $15\%\ C_t$ plus $10\%\ D_t$ plus $20,000.00
$C_t = 10\%\ A_t$ plus $15\%\ B_t$ plus $5\%\ D_t$ plus $45,000.00
$D_t = 15\%\ A_t$ plus $5\%\ B_t$ plus $5\%\ C_t$ plus $15,000.00

The above equations are solved by an "over and over" process, substituting

SUMMARY SOLUTION OF OVERHEAD DISTRIBUTION

	Dept. A	Dept. B	Dept. C	Dept. D	Total
Initial expense	$50,000.00	$20,000.00	$45,000.00	$15,000.00	$130,000.00
Add incoming charges from:					
Department A	----	3,183.23	6,366.46	9,549.69	
Department B	3,480.96	----	5,221.44	1,740.48	
Department C	5,804.75	8,707.13	----	2,902.38	
Department D	4,378.88	2,919.25	1,459.63	----	
Totals	$63,664.59	$34,809.61	$58,047.53	$29,192.55	
Deduct Out-going Charges To:					
Department A	- - -	3,480.96	5,804.75	4,378.88	
Department B	3,183.23	----	8,707.13	2,919.25	
Department C	6,366.46	5,221.44	----	1,459.63	
Department D	9,549.69	1,740.48	2,902.38	-----	
Adjusted expenses to be distributed to manufacturing and expense accounts	$44,565.21	$24,366.73	$40,633.27	$20,434.79	$130,000.00
Difference	($ 5,454.79)	$ 4,366.73	($ 4,366.73)	$ 5,434.79	

EXHIBIT 2

each time the new total expense for each department arrived at in the previous set of equations.

For practical use this is a prohibitively detailed process if it cannot be accomplished automatically. Exhibit 1 shows a step by step solution of these equations. It can be noted from this example that the new total expense for each department is always greater than the previous total and the difference grows progressively smaller with each step. A check on the correctness of the calculations as they are being performed can be obtained since the new approximation must never be less than the old approximation.

From Step 1 in Exhibit 1, it can be noted that Department A received a $2,000 charge from Department B, $4,500 from Department C and $2,250 from Department D. These charges, plus the initial direct cost of Department A, results in a new expense total of $58,750. Similarly, the new "estimate" for Department B in Step 1 is $30,750, for Department C $53,750, and for Department D, $25,750. When substituting these new values in the formula, Department A now receives, in Step 2, charges of $3,075 from Department B, $5,375 from Department C and $3,862 from Department D. The resulting new "estimate" for Department A is $62,312.50.

The equations can be solved by this "over and over" process and, after several steps, a point will be reached at which the new values will be the same as that of the previous equation. At this point, the equation is considered solved. In our illustration thirteen steps were required to complete the problem. If less accuracy is acceptable, the number of steps can be reduced.

Exhibit 2 summarizes the solutions to the above equations and shows the effect of transferring charges, prior to allocation to nonservice accounts. The accuracy of the solution is checked, since the sum of initial expenses of the four departments is the same as the revised total resulting from the solution of the equations.

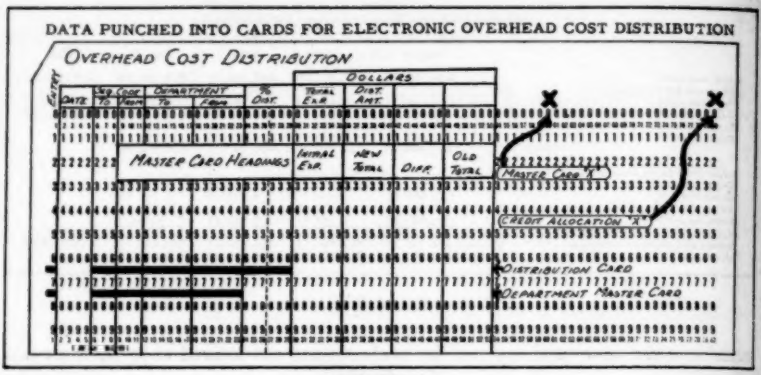

EXHIBIT 3

Use of IBM 604 Electronic Computer

The same basic pattern is followed in solving the equations using an IBM 604 Electronic Computer by a "calculate, sort, reproduce, sort" cycle. The computer actually calculates each distribution equation through a step-by-step process similar to that outlined above. This is done at very high speeds and the computer is able to solve very complex schedules which, under other systems, would be impractical of solution.

In using an electronic computer, it is necessary to prepare and maintain two files of prepunched cards. One file contains a detail card for each interdepartmental distribution to be made and shows pertinent information relative to the "from" department, "to" department and per cent of expense to be distributed. The other file contains a department master card for each department currently appearing in our chart of accounts. Since considerable alphabetic information appears in our department codes, we have assigned and use special three-digit sequence codes to reduce the time required to sort cards into department sequence.

A sample card form is shown as Exhibit 3 to illustrate the various card columns used and to show the information keypunched initially into the cards used in our machine procedure. The initial expenses to be distributed are supplied for each service department on a departmental expense sheet. These expenses are developed and furnished monthly by our cost accounting department. From these sheets, we punch initial expense cards for each department, which are used to introduce initial amounts into distribution cards and department master cards. Considerable time can be saved by pulling out all distribution cards for nonservice departments and using only service department cards in initial calculations. This is possible, since transfers to nonservice departments do not con-

FORM OF OVERHEAD COST DISTRIBUTION
RESULTS PRODUCED BY ELECTRONIC EQUIPMENT

M503

To	From	M503 Estimated Expense		3,000	From	To		
M503	M504	.370% allocated	253		M503	M741	.800% allocated	32-
M503	M509	.380% allocated	467		M503	M742	5.000% allocated	329-
M503	M511	5.000% allocated	932		M503	M745	1.000% allocated	65-
M503	M512	.720% allocated	202		M503	M747	.800% allocated	32-
M503	M513	.750% allocated	78		M503	M749	2.000% allocated	130-
M503	M514	.200% allocated	5		M503	M781	1.000% allocated	65-
M503	M517	18.000% allocated	1,108		M503	M786	1.000% allocated	65-
M503	M578	.020% allocated	26		M503	M787	1.000% allocated	65-
M503	MK582A	.860% allocated	37		M503	M791	.800% allocated	32-
M503	MK520	.800% allocated	385		M503	MK782	1.000% allocated	64-
			3,493	6,493	M503	M292	.750% allocated	49-
From	To				M503	M420	3.000% allocated	195-
M503	M010	1.950% allocated	68-		M503	M440	8.380% allocated	544-
M503	M150	25.500% allocated	1,658-		M503	M460	5.000% allocated	325-
M503	M220	14.200% allocated	922-		M503	M470	2.000% allocated	130-
M503	M222	4.000% allocated	260-		M503	M590	1.600% allocated	91-
M503	M607	9.380% allocated	604-		M503	M592	1.420% allocated	92-
					M503	M605	10.500% allocated	682-
								6,493-
								NET

EXHIBIT 4

tribute to the solution of the distribution equations. After the equations have been solved, nonservice department cards can than be included in a final calculation cycle to arrive at the amounts to be distributed to these accounts.

In this work, we require a limited use of the following IBM punched card equipment:

604 Electronic computer	514 Reproducer
082 Sorter	024 Card punch
077 Collator	056 Card verifier
407 Tabulator	

A sample finished report is presented in Exhibit 4. This report furnishes the necessary information to prepare journal vouchers to make the desired inter-departmental overhead cost transfers. A report is prepared for each active department. For those who may wish to adopt a similar machine accounting application for their company, a detailed flow chart presentation, including supporting written procedures would naturally be helpful. (Author's note—we have a limited supply of our company's chart and procedures available to any readers who may request them.)

Advantages and Significance of the Application

Based upon our experience to date, we have realized numerous advantages from our new procedure. In addition to significant savings in man-hours required to compute our overhead distribution schedules, we have also found the following benefits:

1. Distribution of charges among departments is more accurate.
2. Overhead distribution information is available for operational reports at an earlier date.
3. Journal voucher preparation has been simplified and posting time reduced.
4. A complete record is now available showing in and out entries for each de-

partment. This has been most helpful in explaining overhead charged to department managers.

5. Cost comparisons are now more realistic, since service department costs reflect the charges from other service departments.

In this article, the endeavor has been to present a case study to illustrate our use of the IBM 604 Electronic Computer in computing overhead distribution by use of simultaneous linear equations. In addition to this main objective, the machine methods illustrated may be of interest to accountants as a possible indication of a trend toward the use of electronic computers in handling accounting data. Recent developments of new and varied electronic computers and their increased application by many companies point to a new era in the field of accounting.

A Sampling Technique For Prorating Delivery Costs

by WERNER Z. HIRSCH

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There has been increasing recognition of the important contributions which statistics can make to many accounting problems. This paper presents a case in which statistical sampling techniques were applied successfully in the improvement of a department store delivery cost proration procedure, and suggests further application of the techniques described.

MANY DEPARTMENT STORES, in order to check the efficiency and profitability of their various departments, prorate overhead costs for each department. One such overhead cost which often is difficult to prorate equitably is the monthly cost of delivering merchandise to customers. In at least one department store chain this internal control data has additional significance in that it not only affects management decisions but also the take-home pay of the departmental buyers.

The sampling technique for prorating monthly parcel delivery costs as presented here was developed, tested and introduced in a large department store in the midwest. This sampling technique procedure has been shown to produce results of predetermined reliability and precision at substantial operating cost savings. The method previously used required the services of two full-time employees. The introduction of the sampling technique procedure reduced the cost by about 90 per cent.

The Situation and the Former Method

When a customer makes a purchase, a sales ticket form is completed in duplicate. The number of the department originating the sale is indicated on the sales ticket. When the customer wishes to have the parcel delivered to his home, the original ticket, with the customer's address on it, is affixed to the parcel. The parcels are wrapped in some 30 to 40 wrapping stations dispersed throughout the store. From these stations the parcels move to the delivery department while the duplicate tickets find their way to the office of the wrapping department by the close of the business day. (There can be more than one parcel as well as several purchases on a single ticket. It was found that there were on the average about 10 parcels for every 9 tickets.)

Previously, all duplicate tickets were sorted by departments and then placed on scales and weighed, in order to obtain an approximate figure for the number per department (counting the tickets was considered to be too time-consuming and costly). The weight of the tickets of a given department was multiplied by a constant to determine the number of parcel deliveries originated by each department. However, this method did not produce highly reliable information. For example, in one test period in 1954, a total of about 190,000 parcels were actually delivered while only 110,000 tickets were sorted according to the determination by the weighing procedure. Further, in the same test period, the ticket count indicated about 1,100 deliveries originating from the ladies' hat department although the department actually had made no more than 800 transactions. A possible reason for these inaccuracies is that sorting and weighing was considered to be so simple a job that it was assigned to poorly-paid and unqualified workers who lacked a feeling of responsibility. The task kept two full-time employees busy throughout the year. Their salary, the transportation of the tickets, and the final computation cost were calculated to amount to costs of about $5,000 per annum.

Sampling As An Approach to Department Store Problems

It becomes apparent, in thinking of this particular case, that department stores can use sampling techniques. Many department store operations cover a very large number of items, e.g., hundreds of thousands of deliveries, sales tickets, customers' accounts, units of merchandise, etc. In many of its operations, the management of a department store need not have absolute accuracy in cost calculations. Prorating of overhead costs and aging of accounts receivable are but two instances where department stores are seeking information for internal purposes in which minor inaccuracies in the information are unlikely to result in any substantial effect on decisions. Department store executives often are willing to accept information which they know is not "dead sure" to use data in which they can place a degree of confidence such as 95 per cent or any other predetermined per cent. Where such a relative reliability is acceptable, sampling techniques attain a position of importance. Many department store problems are amenable to sampling techniques which usually can produce substantial savings in costs of related operations.

Statistical sampling techniques make possible estimates of predetermined precision and reliability. By precision of a sample estimate is meant the extent to which it deviates from the value which would be found if all items, e.g., in our case, all tickets, were examined and counted correctly. The reliability of an

estimate based on samples indicates the proportion of times in which the sample estimate will, in the long run, not deviate from the total count value by more than the established precision. Let us illustrate this point in connection with the determination of the percentage of all parcel deliveries which were originated in a given department.

The store executive does not need to know, let us say, that exactly .37842 per cent of all parcel deliveries originated in Department No. 87. The last digit in the above percentage figure, only two hundred thousandth of one per cent, would not reflect a significant cost amount. This accuracy is not needed to assist in the evaluation of the profitability of a department. Management may establish at the outset the degree of confidence which it needs in order to be able to accept the estimate as well as the limits by which the estimates may be allowed to vary from the actual value. In the case under review, management decided that it needed to have 95 per cent confidence in its data.

For example, if a department actually originated 5 per cent of all parcel tickets, it was desired that an estimating procedure would indicate it to have originated neither more than 5.5 per cent nor less than 4.5 per cent of all parcel deliveries and that the given outcome would prevail 95 out of 100 times in the long run. The 95 per cent level of confidence reflects the called-for reliability. The plus and minus one-half of one per cent reflects the precision of the sample estimate at the above level. To continue the illustration, management felt that if a department actually originated 1 per cent of all parcel tickets it would like to be 95 per cent confident that this department would neither be overcharged nor undercharged by more than 2 tenths of one per cent.

How The Sampling Technique was Applied

The hundreds of thousands of parcels which are delivered in any one month constitute the parcel populations, i.e., a complete enumeration of all parcels. The monthly delivery cost is to be prorated to the departments in which the parcels originated. It is clear that it is simpler to work with the duplicate tickets rather than to sample the bulky parcels and to copy from them the originating department which is to be charged. The duplicate tickets can be sampled readily in the wrapping department of the store where they are all collected daily.

If all duplicate tickets are of about the same size and thickness, a "yardage box" of the dimensions of the tickets can be built and placed in the wrapping department. In this case, the tickets were such that it was possible to build a yardage box which was 4 inches wide, 2½ inches deep, and 12 inches

high, with a solid base and three smooth sides. The fourth side, the front, was left open so that sample tickets could be withdrawn readily. The two side walls were perforated with holes one inch apart.

The duplicate tickets were stacked vertically in the upright yardage box more or less in the order in which they reached the wrapping department. To assure uniformity in the number per inch of the vertically stacked tickets, the box was stacked carefully and filled completely. A two pound piece of copper, the size of the tickets was placed on the top of a full box of tickets in order to compress them. By this method it was possible to succeed in having approximately 300 tickets per inch. (There were classifications of tickets not conforming to this, creating a situation taken up later.) Next, through each of the side holes a long hat pin was inserted to delineate "inches of tickets." Tickets above the uppermost pin were put aside to go on the bottom of the next yardage box.

From under the uppermost hat pin, a predetermined number of tickets was drawn. These sample tickets were placed in a "storage box" while the remainder of the tickets in that inch were discarded. Next the predetermined number of tickets was drawn from under the second pin. These sample tickets were also placed in the storage box and the remainder of that inch was discarded. This procedure was continued until the yardage box had been emptied.

Whenever there was available time in the wrapping department or office of the comptroller, the sample tickets of the month (selected as has been described) were sorted by departments and counted. At the end of the month, the departmental data were added and percentages calculated indicating the share of tickets—and thus parcels—which had originated in each department during the month. (Rather than adding these partial counts at the end of the month, it would have been possible to have deferred the count of the sample tickets until then. In a given case, various administrative considerations would determine the alternative to be elected.) Having determined the relative percentages of parcels by department, the final step was the prorating of the monthly delivery costs consistent with them.

What Size Sample?

It has been indicated that a predetermined number of sample tickets was drawn from every inch of tickets (approximately 300). The determination of this sample number requires additional discussion. The decision of how many tickets to draw is related to the problem of how large an overall sample is desired to be obtained during the month. At this point it would be well to

dispel a misconception commonly held concerning the size of overall samples. Sample reliability and precision do not depend primarily on the sample size in relation to the population size. A 50 per cent sample can be substantially inferior to a 1 per cent sample, depending upon the absolute sample size in the two cases. It is the absolute sample size, in conjunction with otherwise proper sampling methods, which makes for good or poor sample information. Increasing the sample size enhances sample reliability and precision.

In using the sampling method, the size of the monthly sample can be affected by changing the number of sample tickets drawn per interval of tickets as well as the magnitude of the interval. In general it can be said that the same monthly sample size produces better results if few sample tickets are drawn at close intervals. However, drawing a few flimsy sample tickets (they are but 1/300th of an inch) at short intervals is rather tedious and time consuming. Further, the drawing, sorting and counting of a few more tickets involves a very small additional cost.

An intensive study of the problem indicated that, whenever a store has more than 100,000 delivery tickets per month and has tickets of about 1/300th of an inch thick, it can obtain data for prorating purposes of a high reliability and precision by drawing about 10,000 tickets per month, from 5 to 15 tickets at a time. For example, a store with about 300,000 tickets in a given month could draw 10 tickets from each inch and thus have 10,000 sample tickets at the end of the month. Then, a department which actually originated 5 per cent of all delivery tickets in a month when the delivery costs amounted to $50,000 could be 95 per cent confident that its share, which actually should be $2,500, will be estimated on the basis of the sampling procedure followed to be not more than $200 larger nor over $200 smaller than it actually should have been. A department which, in fact, originated 1 per cent of the tickets and the prorated cost of which should have been $500 can be 95 per cent confident that, on the basis of the sample estimate, it will be charged neither more than $590 nor less than $410. The department which actually originated one-half of one per cent of all tickets can have a 95 per cent confidence that it would neither be overcharged nor undercharged by more than $70.

It will be noted in the three levels illustrated above that the degree of confidence or reliability is held at 95 per cent while the precision as measured by allowed deviation from the true value increases as the percentage originated decreases, i.e., at 5 per cent, a deviation plus or minus of 8 per cent; at 1 per cent, a deviation plus or minus of 18 per cent; at one half of 1 per cent, a deviation plus or minus of 28 per cent. Considering that most departments

have a very substantial monthly gross margin of many thousands of dollars, such minor sampling errors are fully acceptable.

Sample Selection When Monthly Deliveries Vary Widely

Additional complicating factors need to be considered. For example, in practically all stores, the number of parcels and tickets varies widely from month to month. Usually deliveries are quite light in June and July. They are very heavy in November and December. In the store studied, the December deliveries were about three times as heavy as June deliveries. If every month 10 sample tickets were to be drawn from every inch of tickets, the monthly sample would vary greatly in size and quality. Maintaining the same sampling procedure for every month has administrative advantages. The simplicity, however, may be more than offset by possible disadvantages. Under such circumstances it would be better to select a number of sample tickets per interval which would, even in the lightest month, produce an agreed upon minimum sample size, e.g., 10,000 tickets. In months of heavy deliveries the sample size would be many times the minimum size.

The management in the department store objected to enlarging the sample to more than 10,000 tickets per month. In order to draw a sample of about equal size and quality every month it would have been possible to vary the number of tickets which were drawn per interval (one inch) of tickets or to vary the size of the interval with the same number of tickets drawn per interval. The latter approach would have required different distances between holes, thus new yardage boxes. Hence, it was agreed to retain the interval but to vary the number of sample tickets per interval each month. Having determined to sample about 10,000 tickets every month by varying the number of tickets drawn per constant interval, the steps described in the next two paragraphs apply.

Although the number of deliveries would not be known for the forthcoming period, it was possible to make a reliable estimate on the basis of the number of parcel tickets written in that period in the preceeding year as adjusted for changed conditions. If the monthly number of tickets written in the preceding year is not known, yet the parcel number is available, the first can be approximated by using the average parcel to ticket ratio. In this case it was 10 to 9, as already noted.

The expected size of the ticket population can be designated as N. Having stacked the tickets so that there were about 300 per interval, e.g., per inch, and agreed upon a monthly sample size of 10,000 tickets, a sample cluster of size

$\frac{10,000}{N/300}$ or $\frac{3,000,000}{N}$ was drawn from each interval. For example, in a given month 360,000 tickets were expected. Under the circumstances, a cluster sample of size $\frac{3,000,000,}{360,000}$ i.e., 8-9 tickets, was drawn from each interval. In a similar manner, a formula can be devised to calculate varying intervals which, using the same cluster size every month, will produce a sample of a stable, predetermined size.

Handling Variation in Ticket Thickness and in Costs Per Parcel

Another circumstance which had to be considered was that the store used different types of tickets for orders taken in the store, received by telephone, and received by mail. If these tickets had differed only in color, no new problem would have arisen, but they varied also in thickness. Therefore, a separate yardage box had to be built for each type of ticket. To obtain a proper sample, the intervals between holes in the different types of yardage boxes were arranged so that each interval produced the same number of tickets, e.g., 300. For example, it was determined that there were about 300 mail order and 400 telephone order tickets per inch. Accordingly, a mail order yardage box with holes one inch apart was constructed. A telephone order yardage box with holes ¾ of an inch apart was constructed.

Also, not all deliveries involved the same cost. A pair of shoes is usually less costly to deliver than a mirror or an electric washing machine. Nevertheless, in the above ticket count, there would be but one ticket for a shoe delivery or for a mirror delivery. To reflect the relative cost of a delivery, this store, as many others, assigned unit weight factors to departments. For example, the shoe department's unit weight factor might be 1, that of the mirror department might be 3, and that of the furniture department might be 5. Thus, if 4,000 shoe deliveries were multiplied by 1, while 2,000 mirror deliveries were multiplied by 3, the prorated delivery cost for the mirror deliveries would be 50 per cent more than the shoe deliveries.

The method which was used to prorate delivery costs of parcels for which there were three different types of tickets and delivery difficulties varying by departments, may be helpfully summarized. A special yardage box was developed for each ticket type, placing holes so that an interval of one box contained about the same number of tickets as that of another box. The agreement being to sample about 10,000 parcel tickets every month, the expected number of monthly tickets was estimated and, with the use of the equation

$\frac{3,000,000}{N}$, the sample cluster size was determined. The same number of sample tickets was drawn from each yardage box, though the intervals varied from box to box. The sample tickets were collected in a storage box, sorted by departments and counted, so as to produce the departmental sample totals at the end of the month. To estimate the total number of parcels originated by each department, the department's sample count was multiplied by the number of tickets per interval, and this was divided by the size of the sample cluster per interval. For example, let us assume that 100 tickets originated by Department No. 183 were found in the sample in a period in which 10 tickets were drawn at 300 ticket intervals. It could then be estimated that $\frac{100 \times 300}{10}$ or 3,000 tickets were originated by Department No. 183.

Assuming that the ratio of parcels to tickets was about the same in each department, it was not necessary to convert ticket estimates to parcel estimates. (Even if that ratio varies, it can be reflected in the department's unit weight, and then the method is again valid.) The next step was to multiply the estimated number of tickets of each department by the department's unit weight factor. All of the weighted departmental data were then added to obtain a grand total. Dividing the month's parcel delivery costs by this total yielded a "unit charge" for the month. Finally, the monthly parcel delivery costs to be distributed to each department were determined by multiplying the unit charge by the number of units originated by each department.

Other Functions to Which Procedure Applies

When Miguel de Cervantes said, "By a small sample we may judge of the whole piece," he might not have been aware of the large variety of problems in which sampling techniques would be useful. The department store, with its large-scale operation, promises to be a fruitful field for attaining cost reductions through the use of sampling techniques.

The case discussed here has illustrated how costly sorting and counting of all sales checks, delivery tickets, account cards, etc., can be replaced by arranging the units to be sampled in yardage boxes and measuring sample clusters. As a result, it will take little time and cost to obtain a reliable sample of such items. In turn, prorating of overhead costs, aging of accounts, and auditing, to mention but a few problems, can be accomplished successfully by using sampling methods which are relatively less costly and yet can produce information of the degree of reliability and precision deemed appropriate by management.

Interpretative Use of Direct Sales Advertising

by SYDNEY WOOLDRIDGE

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The results of advertising, except broadly, are the great unknown under most methods of soliciting sales. However, when the advertising copy itself—magazines, newspaper, radio, television—does the soliciting, as with coupon advertisements, the story is different. Response to advertising, in this case, may govern other policies than that of the advertising budget, as the present article discloses.

THERE ARE TWO KINDS OF ADVERTISING, institutional and direct sales. By its nature, the results of institutional advertising—advertising designed to gain a favorable impression without immediately extracting dollars from pockets, such as "Ask Dad, He Knows," "Ours Is Better," "Have You a Little Fairy in Your Home?" can be measured only by estimates subject to prejudice and wishful thinking. What industry generally might call product advertising as distinguished from brand advertising, may also be included in this category.

The results of direct sales advertising, on the other hand, can be measured to a penny and the conclusions to be drawn are inescapable. Which copy pulled best? Which magazine? Which date of issue? Which date of the month? Which day of the week? Which page position? Color, or black and white? Which radio pitch? Which station? What was the geographical distribution? What pulled the most? What pulled the fastest? What medium has the longest life? How much profit did we make per dollar of advertising? Where shall we spend our next appropriation? Every question has a precise answer.

There are three types of direct sales advertising: (1) the pull for an immediate sale at a profit, with or without a follow-up for further sales, e.g., "Send $1. today," (2) the offer of a loss leader for the purpose of gaining a long-time customer, e.g., "trial subscription, eight months for the price of five, limited time only," and (3) the approval offer, e.g., "send no money. We will ship on approval for free examination in your own home."

Approval-Offer Advertising

The problems involved in the approval offer are the most extensive and include the problems of the other categories. They are:

1. Securing payment for, or the return of, the merchandise shipped on approval.
2. Conversion of the prospect, whether or not payment for the approval shipment is secured, to an active buying basis.
3. Following up active customers.
4. Following up inactive customers.

The accountant's job in this operation is to gather and correlate the data involved in these activities in order to measure performance and to establish standards for future advertising budgets. He must recognize the appropriation is in three parts: for maintenance, for expansion, and for testing.

The purpose of the maintenance appropriation is to balance customer mortality. For example, if the mortality rate is twenty-five per cent per year, then an appropriation large enough to cultivate that quantity of customers must be made if the company is to keep the same number of customers. This does not necessarily mean, however, that the appropriation to replace twenty-five per cent of last year's new customers must be twenty-five per cent of last year's expansion appropriation. The maintenance appropriation is laid out in the top producing media. The expansion appropriation is laid out in the next best media.

In laying out the testing appropriation, the emphasis is on developing new media sources of advertising, because there is a mortality of production in media, also. A given magazine may be the top producer one year and, for any of several reasons, may fade out of competition in two or three years. Or the advertiser may saturate the potential of that medium (or the combined efforts of competing advertisers may do so). Then, too, a change in the magazine's rates may ruin the ratio of return, etc. A constant flow of information, therefore, must be maintained by placing advertising of a testing character, even though testing is speculative and media which have been proved to be producers may be unused during the period of testing. This may seem like gambling when proved returns are available. However, in the long run it is an investment.

The Construction and Place of the Advertising Budget

The advertising budget is built up according to past experience and the indicated trends of each medium in the seasonal totals of each of the following elements for each medium:

1. Dollars appropriated.
2. Estimated cost per inquiry, based on previous experience.
3. Total inquiries, or the quantity of samples to be shipped (1 ÷ 2).
4. Value of samples (3 x standard cost).
5. Percentage of sample payments expected, based on previous experience.
6. Dollars of sample payments (4 x 5).
7. Percentage of sample returns, based on previous experience.
8. Dollars of sample returns (4 x 7).
9. Dollars of unpaid, unreturned samples (6 minus 8).
10. Percentage of closures, based on past experience.
11. Number of closures (10 x 3).
12. Dollars of business per closure, based on past experience.
13. Total dollars of business (11 x 12).

The totals of each element for all media form the basis for the sales, manufacturing and operating budgets, indicate the required reserve for unpaid mer-

chandise, etc. This synthesis, of course, is further complicated by the variety of standard samples, if there is more than one. The advertising budget is then broken down by element, by medium, and by month or week to show the pacing of expenditures, receipts, and transactions. This breakdown indicates the pacing of sales, manufacturing, purchasing, borrowing, etc.

Identification of Advertising With Inquiries and Orders

When the advertising budget thus determines the operations of a company, the importance of the accurate measurement of advertising results and the forecast of future results cannot be overstressed. To achieve these ends, inquiries for on-approval merchandise must be recorded by medium, by copy, by date of issue, by date of inquiry, and by geographical distribution. Total dollars of business during the season of record, or at least the total business up to, for each customer, a specified significant amount, must be recorded by medium, by copy, by date of issue and by geographical distribution. The geographical distribution, the number of sample payments and sample returns, and the total dollars of business by media usually may be disregarded conveniently until the end of the season. Figures for inquiries by media and for sample payments and sample returns in total, however, are of daily significance, because variations of performance may require immediate revision of the advertising schedule.

Media, copy and date of issue, in the case of printed advertisements, are coded for identification, the code appearing in the coupon of the advertisement. A simple code, amenable to punched card manipulation, is the use of two digits preceded and followed by a letter, as D24B. The first letter and first digit indicate the medium: for example, in this case, Delineator magazine. The second digit and second letter indicate the date of issue and copy: for example, in this case, April, second version of copy or layout, or April, second week or April, first week, second version of copy. To insure the use of the code by prospects who do not clip the coupon, it should be part of the address.

In the case of radio and television, it is not practical to use a code in the "pitch." A code may be assigned as a matter of internal procedural convenience but identification must be made by inference. When the prospect responds by telephone—"Call Me 7-9100 now, our operators are standing by. Call Me 7-9100 now. That's Me 7-9100"—identification even of the hour of the pitch is simple. When the prospect responds by mail, identification must be made on the basis of past experience patterns of the time of response, as indicated by the date of the postmark. Accuracy in this reporting requires the exercise of care.

Use of the Results to Revise Advertising and/or Operating Budgets

By the projection of the pattern of only a few days of new experience on the pattern of the previous experience of response to any one medium, the accuracy of the budgeted forecast may be checked, new trends may be determined, and the budget may be revised accordingly. Because of the long-range nature of magazine advertising, it may be necessary to maintain the advertising appropriation as originally scheduled and to revise the sales and manufacturing budgets. In the case of newspaper and television advertising, where the response is more immediate, not only to the date of issue but also the date of the advertising contract, it may be possible to revise the advertising budget.

Daily, Weekly, and Seasonal Records and Reports

Daily reports of the significant transactions initiated by advertising should be made to the accounting department and, after being correlated to the budget data, reported daily or weekly to management. The transactions of daily or weekly significance are the number of inquiries and cost of inquiries to date by medium, the total number of payments for and returns of samples and the respective percentages of samples shipped, and the total dollars of business. Only when the percentages of payments and returns vary significantly from the budgeted percentages need the elements be broken down by medium to discover the soft or burgeoning spots. Weight must be given, also, to uncontrollable factors affecting the transactions, such as floods, strikes, or weather.

The seasonal records may be accumulated by any one of a number of methods. A handwritten card file may be satisfactory for a small operation but would be prohibitively cumbersome for a larger operation. For each account, an address plate with coded tabs or a coded card to be punched with a stylus, either one to be machine- or sight-read and tabulated at the end of the season, or coded cards marked with a graphite pencil and later electronically sensed and tabulated are all available. Provision must be made for coding the advertising medium which generated the account, the sample condition (unpaid, paid or returned), the cumulative dollars of business, and the geographical location.

Record-keeping is complicated by the fact that, after the first season, each account enters a new category, either as an unpaid account, an active account (paid for samples and did business), an inactive account (paid for samples but did no business), or a hybrid (did not pay for samples but did business).

The unpaid accounts present no problem—of record keeping, that is. The active and inactive account files, on the other hand, become new media to be

mined by direct mail operations. The budgeting and reports are the same as for any other advertising medium, but they must be treated as distinct media. Again, there is no problem as far as the records in the particular status are concerned. They are kept in the same form as the records for other media. However, it is desirable and often mandatory to maintain through several seasons a history of the transactions generated by the originating media. It is only through such a history that the mortality and the quality of prospects can be determined. This means that the identification of the originating medium must be maintained for each account for the prescribed number of seasons, that seasonal data be reported by the active file and for those accounts in the inactive file which become active, and that the same data be tabulated to show the continuing activity of the originating advertising medium. Accounts remaining in the inactive file at the end of the second and succeeding seasons of the maintenance of the identification of the originating media may be disregarded as individual units, being summarized in the seasonal reports as negative elements.

Some Typical Information Developed

Seasonal reports of the transactions involving each element of the advertising budget, broken down by media and geographically, must be correlated to the experience of past seasons to give intelligence for further planning. Here the way media are measured. Magazine A gave us a terrific number of inquiries per dollar of advertising. However, were the sample losses so great that the total advertising cost was prohibitive? How about the ratios of closures and dollars of business to inquiries? Were they average, half of average, double the average? In spite of the terrific response of prospects, the ratio of profits to advertising costs may be undesirable. Magazine B was good ratio-wise in all elements, but it just doesn't have enough circulation to generate a worthwhile amount of business. We'd better cut down on Kentucky radio and newspapers and put more into the Cleveland area. Color ads pulled better than black and white, but not enough better to offset the increased cost. The same for television compared to radio. The slogan, "Make $45 Weekly" pulls better than, "Make $50 Weekly."

These are the facts we have learned and now we can act accordingly.

Tracking Down the Phantom Costs Of Office Services

by BRUCE A. STEPHENS

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Noting that little attention is usually paid to identifying departmental usage of company service facilities, the author of this article reports a case in which these facilities had been centralized in a services department and allocation bases for the cost of five principal ones were worked up—and satisfactorily applied.

FOR SEVERAL YEARS, the costs of the office services department, including office supplies, have been lost in a maze of administrative costs—in fact, buried as far as bringing out in dollars and cents exactly how much it costs each section of the company and to what degree it can justify its existence. I think this is a general situation. In our company, as we progressed further into budgeting, it became clear that this item of controllable cost should be given consideration, not only for the better information of the department receiving the cost but also to prove to the supervisor of office services that he could operate a paying function. After thorough study, a program was developed for:

1. Determination of the nature of services rendered and the total cost of each to the company.
2. More accurate calculation of the operating costs of each department, including the costs of services rendered to such departments by the office services department.
3. Provision of an accumulation of such costs in a manner which would place them in the budgets of each department as controllable expenses.
4. Provision of a measure for efficiency of the service unit in providing services to other departments on a "purchase" basis.

This discussion covers mail and messenger service, office supplies, duplicating services, form design and preparation, and addressograph service. Other functions of the office service department include tabulating, telephone, telegraph, teletype, records storage, and postage. For the first group, it is believed that the methods of allocation set forth here are sound and accomplish, with a minimum of paperwork, the objectives already set forth. Studies have not been completed for the second group. Hence their cost allocation bases are not discussed.

Messenger and Mail

The total direct cost of the messenger service as now maintained was computed at $100 per week on the basis of a fifty-week year. (The plant is shut

down for an annual two-week vacation period.) Of the total time of the messenger, it is estimated that approximately 40 per cent is engaged in functions which are the specific responsibilities of the treasury department. Therefore, $40 per week may properly be credited to expense recovery for office services department and charged to the treasury department. The remainder of the messenger service costs represents either pick-up and delivery of mail or sundry errands, the costs of which are most appropriately absorbed in the same ratio as the cost of intra-plant mail service. The amount of $60 a week was, therefore, added to the other direct costs of the inside mail service in arriving at its charge rate.

After allocating a portion of the expense of mail clerks to telephone expense, to cover the fact that they provide switchboard relief, the remaining direct costs of mail service plus the above-mentioned allocation of messenger costs was spread over the number of mail stations within the plant, adjusted for the fact that mail stations in the office require approximately twice the service needed by mail stations in the factory. These calculations resulted in a charge of $4 per week to service each station in the office areas, and $2 per week for each station in the factory. Each week, the office services department is credited with the total amount charged to departments for this service.

Office Supplies

The first step in providing a complete service in respect of office supplies was the preparation of a standard stock catalog, consisting of a listing of items which are regularly carried. The standard unit of issue, and a standard price for each unit, with the stock number of the supply, are noted in the catalog so that the department requisitioning items will know how much money it is spending. Included are all office forms in regular usage, whether or not they are printed in our own print shop or procured outside.

As office supplies are purchased, they are charged to the inventory account for the particular supply, at actual cost. Based on requisitions to stationery stores, they are credited to this inventory account and charged to the requisitioning department at the standard prices listed in the catalog. Forms produced in our print shop are charged to the inventory account at the standard prices established as the normal cost of producing them. There is thus built up in this inventory account a variance between actual costs and the standard prices at which items are charged out of stationery stores. Based on periodic review, prices to be charged are adjusted so that, when a physical inventory is taken at the end of each year, a minimum variance appears. This variance is taken up

annually and spread to all departments as expense, based on their directly charged office supply costs for the entire year.

Nonstock items are requested on the same stationery stores requisitions used for standard stock items. When the requisitions, properly approved, are received in the office services departments its supervisor initiates a purchase request, forwarding the original and one copy to the purchasing department, and retaining the second copy for follow-up. The purchasing department initiates purchase of the item and returns the copy of the purchase request to the office services supervisor with the actual price to be paid for the item noted. If the actual price is not known, the purchasing department enters its best estimate of the cost. Upon receipt in stationery stores, the supervisor prices the requisition at the price furnished. When the item is received, it is issued on the requisition. The slight differences which develop between actual costs and the costs supplied by the purchasing department will accumulate in the office supplies inventory.

On the theory that, if stationery stores serves its purpose, office supplies will cost each department less than if each department did its own procuring and stocking, the stores unit is entitled to reimbursement for administrative work, floor space costs, etc. incurred in connection with the operation of its function. Therefore, as the stationery stores requisitions are totaled each week, including both standard and nonstock items, a surcharge of five per cent of the total money value is charged to the receiving departments, with the aggregate of this surcharge credited to the office services department.

Duplicating Services

As used in this article, duplicating services relate to the duplication by hectograph, multilith, or mimeograph, of masters, plates or stencils which have been produced outside the department or else perhaps procured from stationery stores by the department which prepared them, the cost of these materials having been charged to the departments upon issue from the office supply room. All other types of services rendered from these types of units fall within the category of job order work, which is to be separately discussed.

Based on direct labor and material costs (including fluid and supplies), the charge for hectograph work is at the rate of one-half cent per page duplicated, plus ten cents for each master handled. This charge includes both paper and running time. The departmental charge is computed from the requisition for duplicating work sent to the stationery stores area by the requesting department, along with the masters to be duplicated. As paper and supplies used in this work are drawn from office supplies, they are charged from requisitions to the office service department. The charge is transferred to the requesting department.

In the case of multilith or mimeograph work, the rates used are one-half cent per page (one cent per page if printed on both sides of the sheet), plus ten cents per plate, plus, for multilith, a charge of fifty cents for the job if the color of the ink used is other than black. To fall within the definition of straight duplicating work for application of this price schedule, the duplication work would be on 8½" x 11" multilith paper, either unpunched stock or the same stock prepunched, standard seven-hole. If the work to be done on multilith does not fall within the above definition, it is considered job work. As in the case of hectograph work, the supplies issued from the stationery stores for multilith work are charged to the office services department. Again, the total charge for the work is transferred to the requesting department.

Form Design and Preparation

Job work done on the multilith, which is not straight duplicating as that has been defined, plus form design, is the subject of a job order in the multilith unit. The time spent by the operator is posted on a job order envelope, priced at $3 per hour. Stock from office supplies, outside purchases, and outside work necessary for the job are charged to office services department and noted on the job order envelope. At the end of each week, a summary of the job order envelope for all jobs completed within the week is prepared, one of the two following entries resulting:

1. If the item produced is to be charged to a department it is so recorded and the contra entry is to the office services department.
2. If the item produced is for stationery stores inventory, the account for this is charged at the standard price set by the office services supervisor. The total amount accumulated on the job order envelope is credited to office services department expense. The difference between these two amounts, debit or credit, affects the expense of the department initiating the request for or using, in greatest quantity, the item produced.

By proper use of expense account number, the balances for each job are the difference between the actual materials and services charged and the amounts charged out to departments, including wastage of materials in processing and also including the value of work-in-process in the unit performing the job work. It will also be observed that, in cases in which a department initiates a form and requires substantial assistance in the form of job work in connection with it, costs so expended are immediately charged as an expense of the initiating department, since only the estimated normal cost of producing the form is charged to inventory. The standard price is never in excess of the amount which would be charged by an outside printer and, to the extent that the charge approaches this amount, a credit builds up in the pertinent expense account, which can be

utilized to measure the cost savings realized by having the multilith installation. The prices established as standard for forms are set so as to make the charge from inventory the same whether or not such forms are procured outside.

Addressograph

Addressograph work consists of addressing envelopes, tickets, etc. from plates already on file, and preparation or revision of plates. In the first case, some work may be hand fed and other work may be adaptable to continuous feeding. After studies, the price was established as one-half cent for each impression for hand feeding and ten cents per hundred impressions when continuous feeding can be employed. In certain instances, with a continuous feed job, bursting is required, following the impressions. If such is the case, the charge is fifteen cents per hundred impressions. In any case, the stock upon which the impressions are made is charged to expense of the requesting department from the stationery stores requisition by which it is obtained. The charge for addressograph work, thus, is for only the work performed.

In the second case, work requested which involves the preparation of plates or revision of existing plate files is done on requisition. The time of the operator performing this work is charged at the rate of $1.75 per hour, credit being made to office services department. Time record is maintained on the reverse of the requisition, plus accumulation on it of the cost of blank plates used in the work. In the event that the plates must be made outside, the cost of this service is charged from the purchase request to the requesting department.

Satisfactory Results From Allocations Used

By adherence to the plan of cost allocation which has been described in some detail for five office service functions, we are able to properly charge these services to departments using them, to place them in a controllable area from a budget standpoint, to provide for the office services supervisor a measure of the utility of each of these functions, and to bring their hidden costs into the area where they can be scrutinized. By the judicious use of summary sheets for cost reporting purposes, this newly "exposed" department is able to operate on this basis, and still not experience hindrance in its operations with paperwork.

Comparable "Fringe" Cost Figures for Foundries

by J. HAROLD SEARS

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Based on a survey of a group of companies in the foundry industry, this article deals with the so-called fringe benefit costs from the viewpoint that comparison of these costs among companies in the same industry is both helpful in their administration and control and hard to obtain. Narrative and illustrations are used to disclose the results of the survey.

THIS ARTICLE PRESENTS the various considerations involved if a true comparison of one company's costs of fringe benefits is to be made with other companies. To date, fringe benefits have usually been cited in different industries and companies as so much per hour. However, fringe benefits cost per hour is dependent on the makeup of the work week and on the stability of employment. For example, the cost of fringe benefits in a company with stable employment may be twenty-seven cents per hour for a 48-hour, 6-day work week while the cost of the same fringe benefits in a 3-day, 24-hour work week would be 43 cents per hour.

A further inquiry into the makeup of fringe benefits shows us that certain of these are fixed dollar amounts per year which become variable costs per hour with the change of the work week makeup, while a second group are amounts varying directly with the payroll paid and become a fixed cents per hour cost regardless of the work week. There is also a third group, variable up to a point and then becoming a fixed amount. This last group, translated into cents per hour, becomes a fixed number of cents per hour cost for a certain range and then a variable cents per hour cost. Specifically, this group is made up of f.o.a.b. and state unemployment insurance costs.

This matter of fringe cost comparisons came up in a recent foundry cost group gathering. Figures were brought by each member but the apparent range of costs of fringe benefits among the companies represented was so great that comparisons were meaningless. It may be pointed out that the foundry industry is an outstanding example of one with varying work weeks, just noted as the factor underlying fluctuations in per hour benefit cost.

A Survey in Comparable Terms

A general survey was attempted. The first step was obvious. Each company was to figure its fringe benefit costs, as such, using total dollar costs and total

SURVEY WORK SHEET - FRINGE BENEFITS

Average No. of Employees			
	Direct laborers	37	Average rate per hr. $2.25
	Indirect laborers	60	Average rate per hr. 1.66
	Total	97	Average rate per hr. 1.88

Average weeks worked: 52 less 1 week vacation. Less 6 holidays = Net 50 weeks.

Days per week	6	6	5	5	4	3
Hours per week	48	44	40	36	32	24
Days per year	300	300	250	250	200	150
Hrs. per empl. per year	2400	2200	2000	1800	1600	1200
Total hrs. per year (No. empl. x hrs. per empl.)	232,800	213,400	194,000	174,600	155,400	116,400

Fill in dollar amount information in column that fits your average operation for year and also compute on basis of 40 hour week for comparison with other foundries. Further projection in other columns can be made for your own use.

PART I - ANNUAL DOLLAR AMOUNTS

Contract Costs						
Relatively fixed annual amount						
Vacation pay	same	same	same	$9,539	same	same
Holiday pay	same	same	same	7,866	same	same
Group ins.	same	same	same	6,501	same	same
Pension plan	same	same	same	8,025	same	same
Christmas present	same	same	same	808	same	same
Recreation and personnel service	same	same	same	500	same	same
Severance pay.	same	same	same	none	same	same
Doctor and x-ray	same	same	same	600	same	same
Total	33,839	33,839	33,839	33,839	33,839	33,839
Variable annual amt. (depending on days worked & profit)						
Shift differential	960	880	800	720	640	480
Rest period	9,117	9,117	6,837	6,837	6,078	4,559
First aid	561	514	467	420	420	420
Cafeteria	1,489	1,489	993	993	794	595
Profit sharing				none		
Bonus				none		
Total	12,127	12,000	9,097	8,970	7,932	6,054
Contract Costs Total	45,966	45,839	42,936	42,809	41,771	39,893

Bonus						
Total	12,127	12,900	9,097	8,970	7,932	6,054
Contract Costs Total	45,966	45,839	42,936	42,809	41,771	39,893

Costs By Law						
Variable annual amount (depending on hrs. worked)						
F.o.a.b.	6,984	6,984	6,591	6,199	5,511	4,132
Unemployment ins. (Fed & State) rate %	4,947	4,947	4,947	4,947	4,607	3,455
Workmans comp. rate %	5,187	4,747	4,315	3,884	3,452	2,589
Overtime premium	36,472	18,236	0	0	0	0
Costs By Law Total	53,511	34,914	15,853	15,030	13,570	10,176
Grand Total	99,547	80,753	58,789	57,839	55,341	50,069
Total without 1/2 time o'time	63,075	62,517				

PART II - CENTS PER HOUR

Contract Costs						
Relatively fixed annual amount						
Vacation pay	4.1	4.5	4.9	5.5	6.2	8.2
Holiday pay	3.4	3.7	4.1	4.5	5.1	6.8
Group ins.	2.8	3.0	3.4	3.7	4.2	5.6
Pension plan	3.4	3.8	4.1	4.6	5.2	6.9
Christmas present	.3	.4	.4	.5	.5	.7
Recreation and personnel service	.2	.2	.3	.3	.3	.4
Severance pay	0	0	0	0	0	0
Doctor and x-ray	.3	.3	.3	.3	.4	.5
Total	14.5	15.9	17.4	19.4	21.8	29.1
Variable annual amt. (depending on days worked & profit)						
Shift differential	.4	.4	.4	.4	.4	.4
Rest period	3.9	4.3	3.5	3.9	3.9	3.9
First aid	.2	.2	.2	.2	.3	.4
Cafeteria	.6	.7	.5	.6	.5	.5
Profit sharing	0	0	0	0	0	0
Bonus	0	0	0	0	0	0
Total	5.2	5.6	4.7	5.1	5.1	5.2
Contract Costs Total	19.7	21.5	22.1	24.5	26.9	34.3
Costs By Law						
Variable annual amount (depending on hrs. worked)						
F.o.a.b.	3.0	3.3	3.4	3.6	3.6	3.6
Unemployment ins. (Fed & State) rate	2.1	2.3	2.5	2.8	3.0	3.0
Workmans comp. rate %	2.2	2.2	2.2	2.2	2.2	2.2
Overtime premium	15.7	8.5	0	0	0	0
Costs By Law Total	23.0	16.3	8.1	8.6	8.7	8.7
Grand Total	42.7	37.8	30.2	33.1	35.6	43.0
Total without 1/2 time o'time	27.0	29.3				

Illustration Only -- Not Actual Figures of One Individual Company

EXHIBIT 1

hours worked for the year just past, making adjustments for any changes in prospect, e.g., f.o.b. rate rise. Then these figures were to be used as a base to establish a per hour cost for a 40-hour 5-day average work week for a 50-week year. This would put all companies on the same work week basis for comparison. That is why our inquiry involved the columns and instructions shown in Exhibit 1 which develops annual and per hour costs.

There was another factor to take care of in the direction of establishing comparability. Not all the companies represented had the same benefit items. Because these seemed to fall in classes or groups we decided to incorporate in the survey a grouping of items. This itemization is another feature of the exhibit. Shown there are two primary item groups which we called contract costs and cost by law. Costs by law are f.o.a.b., state and federal unemployment insurance, workman's compensation, and overtime premium. The last, debatable as to whether it is a fringe benefit or not, was included in our study under costs by law up to the point of the grand total of fringe benefits. It was then taken out to give a comparison overall of cost per hour without overtime premium. The other group of fringe benefit items was called contract costs for convenience, although a particular foundry might not have a union contract, because they are extras given by the company as a condition of the workers' employments. Although they are not required by law, these items were usually found in contracts of companies which had a union.

The arrangement of Exhibit 1 did much to aid comparability among companies included in the inquiry. All had the same items of costs by law, but the fringe benefit cost of this class varied considerably among the companies in spite of the 40-hour, 5-day work week basis used. Likewise with the costs by law taken out, the contract costs between the different companies were very revealing. It was found that some companies without a union were giving more of this class of benefit than some companies with a union.

To pursue this further, the fourteen different items of contract costs shown in the detail were divided into the variability classifications mentioned earlier. Eight of the items as listed on Exhibit 1 were relatively fixed annual dollar amounts which became variable fringe benefit costs per hour depending on the work week. The other six items of contract costs were varying annual dollar amounts depending on the days worked and profit made by the company. These became almost fixed cents per hour fringe benefit costs.

Work sheets in the form taken by the exhibit were made up and supplied to the surveyed companies, to fill in with annual dollar amounts, each to do so

both in the column in Part I of Exhibit 1 applying to its operation and, by conversion, in the 40-hour, 5-day per week column. Then, using the hours that would have been worked by the company's average work force on a 40-hour, 5-day week basis, the conversion to cents per hour for Part II of the Exhibit was to be made. It was possible for a company to use all columns if it so desired. The figures on the exhibits show a typical survey response, but are not intended to designate any one particular company.

Studying Behaviour of the Cost Categories

From an examination of this response, the behaviour of the categories of fringe benefit items with which we are working becomes apparent. The first group is a fairly well fixed annual amount for an average work force and, therefore, is called a relatively fixed annual amount under contract costs. Recreation and personnel service means the extra above regular personnel work, such as sponsoring a baseball team. Although the annual dollar amount stays the same regardless of the work week in this first group, the hours double themselves from a 3-day, 24-hour basis to a 6-day, 48-hour basis. Therefore the cost per hour decreases as the hours worked increase.

Each item in the second group, except profit sharing and bonus, depends on the number of days worked. These costs double themselves in annual dollar amount from a 24-hour, 3-day week to a 48-hour, 6-day work week. However, with the hours also doubling in this range, the cost per hour stays relatively the same.

The third group, costs by law, is made up of the four items already identified. Workman's compensation insurance premium is based on a percentage of the payroll and increases proportionately in dollars as the hours increase, but this means that the cost per hour stays the same from the high to the low amount of hours worked. The other three costs by law are affected by varying work weeks. F.o.a.b. cost increases in dollar amount up to the time that earnings reach the $4,200 mark and then it levels off and stays a relatively stationary dollar amount, with the cost per hour decreasing as the hours increase. The same condition applies to state and federal unemployment insurance costs except that the limit is on the first $3,000 of wages per employee. Hence, the dollar amount becomes a fixed amount and a variable cost per hour sooner than f.o.a.b. The remaining cost in this group is premium overtime and, needless to say, this amount grows quite rapidly as hours increase over 40 hours per week.

What the Comparisons Showed

We found the following average costs per hour of fringe benefits on a 40-hour, 5-day week basis.

Contract costs	
Fixed annual amount	12.2
Variable annual amount	2.6
Total	14.8
Costs by law	
(Using no overtime premium)	7.4
Total	22.2

This new average now became our guide for comparisons and the following results were tabulated for nine foundries:

		Range	
Contract costs per hour	**Group avg.**	**Low**	**High**
Fixed annual amount	12.2¢	7.4¢	17.4¢
Variable annual amount	2.6	0	4.6
Total	14.8¢	7.4¢	22.0¢
Costs by law per hour			
(No overtime premium)	7.4	5.4	11.4
Total by companies	22.2¢	14.1¢	30.1¢

A comparison of place standings for these nine companies, developed from the survey, showed which type of fringe benefits cost more than others and which type cost less (place order is from highest to lowest total cost):

	Contract Costs		
Total	**Fixed annual amount**	**Variable annual amount**	**Costs by Law**
1 (highest)	1	2	3
2	4	1	4
3	2	7	1
4	5	5	2
5	7	3	5
6	6	4	7
7	7	6	8
8	3	7	9
9 (lowest)	3	8	6

The following comparison shows which items the majority of these nine companies are paying as well as the range of costs per hour for these items:

Contract costs	Range (per hour)	
Relatively fixed annual amount	Low	High
9 had vacation pay	3.0¢	7.1¢
9 had holiday pay	2.9¢	4.5¢
9 had group insurance	1.4¢	3.5¢
1 had pension plan	4.1¢	4.1¢
7 had Christmas present (i.e., turkey)	.1¢	.7¢
2 had recreation and personnel service	.3¢	1.0¢
0 had severance pay		
3 had doctor and x-ray costs	.1¢	.4¢
Variable annual amount		
4 had shift differential	.4¢	.9¢
5 had rest period	2.6¢	5.4¢
7 had first aid	.1¢	.5¢
1 had cafeteria	.5¢	.5¢
0 had profit sharing	—	—
0 had bonus	—	—
Costs by law		
9 had f.o.a.b.	2.7¢	4.3¢
9 had unemployment insurance	.5¢	3.8¢
9 had workmen's compensation	.6¢	3.8¢

With these comparisons based on a 5-day, 40-hour work week with a stable average work force, there is some assurance that there is a basis for comparison. It is possible to see where one company stands within the group and to use these comparisons as a basis for future planning.

Areas of Vulnerability of Profits to Fringe Benefits

Returning to the individual company work sheets for fringe benefits, a few observations can be made. In contract costs, the variable annual amount items stay at relatively the same cost per hour, regardless of the work week, and therefore, seem a more desirable field for granting of fringe benefits than the fixed annual amount items. The increase in cost per hour as hours decrease in the "relatively" fixed annual amount category shows the effect of these items on the break-even point. Although a stable work force does tend to increase the cost of vacations, holidays, and pension plans, the following fringe benefits cost less because of this: severance pay, doctor and x ray, f.o.a.b. and unemployment insurance.

One more item can be examined. That is the one-half time overtime premium. We have learned from this study that our aim should be to keep fixed annual amounts at the lowest figure possible using a relatively stable work force to cover our average needs of production. The impact of fringe benefits on our costs is so great that excess manpower carried for peak loads is impracticable,

especially if it would mean working shorter work weeks to maintain the crew in average or slack times. Peak load manpower might save the premium overtime cost, but the cost of carrying this manpower in slack times would affect our profit drastically. The lesser cost of fixed annual amount fringe benefits in overtime operations helps offset the cost of the premium overtime pay. This, along with higher production to absorb other overhead, results in a profit which is very little affected by this overtime premium.

In a low production period, on the other hand, the overtime premium is not there, but the cost of fixed annual amount fringe benefits becomes a high cost per hour. This will decrease profit because it is a cost beyond the underabsorbed overhead costs due to low production.

Essentials of Comparability

Fringe benefits have become an important item of cost to most companies. This fact indicates that a detailed examination of these costs as well as their comparison with those of other companies in the industry may prove beneficial to a company in future policies or actions. However, fringe benefits can be compared only if those making the comparison submit their figures on the same basis. The basis for comparison would seem to be:

1. Using an average yearly work force.
2. Costs based on a 5-day, 40-hour week.
3. Costs covering a year's period.

A final recommendation would be to break the fringe benefits down into groups for a more effective use of the figures in the comparisons to be made among companies. This grouping can be used effectively in one's own company to compare fringe benefit costs on varying work week bases in the company's particular situation.

The Task of System Management

by C. J. COSTELLO

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In this vigorous paper, the systems function at least comes alive, particularly for the cases of companies in which there is resistance to it. The author by no means blames all of this resistance upon management, but rather indicates the practical difficulties in initiating systems work, its necessary conditions and long-range goals, and the favorable place of responsible, effective, properly proportioned, on-going methods management in successful overall management.

THE VALUE OF DETACHED, programmed, unbiased analysis of administrative activities has gradually attained, in spite of many abuses in practice and irrespective of the existence of some incompetent specialists, more and more recognition. Thus, a stage in the evolution of corporate management has been reached in which the demand for good systems people has outrun the supply. As a consequence of the growing scarcity of qualified systems and procedures personnel, salaries for effective systems men have risen to a degree which makes organization, administration, and development of a permanent systems department in a multi-plant corporation of medium size, a difficult and at times frustrating occupation.

The Difficult Task of Making a Good Start

However, putting aside complaints, as affording no solution, the head of such a systems department nevertheless faces at the outset of the function a situation in which he is certain to be outbid by the largest corporations and by some corporations which will, for one project, take on specialists at almost any asking price and in almost any quantity, with no whole-hearted intention of furnishing permanent employment for those recruited. Moreover, he also faces, as a rule, a less well-settled understanding of the function than might be hoped for. He seldom enjoys unfailing acceptance of its value. Therefore, either he lacks well-advertised top management support or he attains such support spasmodically on an instance to instance, contingency basis. Consequently, since available and qualified systems men can find employment in locations where, momentarily, well-advertised top level support prevails, most seasoned practitioners tend to decline positions in which this aspect cannot be taken for granted. This writer emphasizes that he does not, as one individual, believe that systems work should have the blanket, blind, unreasoning endorsement of top management. He merely points out that systems men, like the rest of us, tend to choose to work where the surface conditions appear most attractive for them.

Finally, the size of the company of the type we are considering generally precludes the use of management engineering training sections, such as have recently appeared in some governmental bodies, with the dual function of rapidly training systems analysts and, at the same time, training senior and junior management in the correct evaluation and most effective employment of the function.

On the other side of the picture, though, one will usually find in the initial operating situation that the opportunities for effective application of systems and procedures analysis are above average. The greater needs justify the more onerous exertions. Moreover, the existing lesser familiarity with the operation of the function results in occasional achievement of a degree of approbation exceeding the true technical merit of the work applauded.

It should be appreciated that the programming of the systems activity will be filled with traps for the unwary. If the manager proceeds under orthodox project control techniques, he will have a very good chance merely of advertising initial staff weaknesses. If he decides to announce an impressive project schedule in the usual manner, he may merely underline the current inability of his staff to execute it. If he courts wide-spread popularity, he will fritter away limited staff time on trifling matters. If he tries to hasten the seasoning of beginner analysts with questionnaires, standard work papers, and other substitutes for analytical common sense and logical thought, he risks the development of too many staff members who will take the course of least resistance and treat these crutches as all-inclusive substitutes for thoughtful analysis. If he accepts projects which are beyond the capacities of his analysts, he will discourage and perhaps lose them. If the projects accepted are too easy, he will breed a group of front runners who will fall back in the stretch.

In this early situation, therefore, the only safe course is, while avoiding the entrapment of an immediately advertised, detailed program, to attempt to achieve scheduling of staff time in the way which will best promote top management satisfaction and sound procedures staff development. Meanwhile, the systems manager must also be a prudently opportunistic recruiter of needed personnel, since every justifiable improvement in the quality of personnel will afford an increasing measure of relief from the evils just recited. Then, too, he must be thinking of an ideal long range situation toward which he intends to build with every swerve and manoeuver of opportunity. In all of this, he must set a good example of living within his budget and achieving results proportionate to the expenditures for systems work.

This approach is a far cry from the

orthodox recommendations of textbook writers and of consultants writing or working under the premise of ideal conditions. It usually means that the manager must at first achieve, largely through personal effort, some large savings which will justify the growing budget for his staff. So, at the outset, ideals of administration and supervision must be sacrificed to the extent of temporarily excessive personal project effort, inescapable if the function is to survive and have a chance to grow in value to the company employing it. An unfortunate aspect of the situation is the strain it places upon young analysts. Analyst failures, avoidable under more intensive supervision, are the price of the project effort required of the manager in the early stages of establishment and development of the systems and procedures department.

Staff Balance and Planned Assignments

Meanwhile, what of the long-range goals? Misguided or completely fortuitous opportunities lead nowhere. In working out of the unavoidable morass incidental to a normal beginning, the systems manager is doomed to fail if he does not have the necessary long-range purposes to guide him in the distinction between real opportunities which promise to speed the department along a path of mounting effectiveness and apparent short-range opportunities that could actually be deathtraps for those aspirations. Thus, in the beginning, despite the need of making a showing, the systems manager must especially be on his guard against greedily exploiting chances of quick savings "killings" entailing no long range benefit to the company. He must continually squelch unfairness, unwarranted appropriation of credit for improvements, and all the other ill-advised staff actions which are known to breed justifiable resentment on the part of direct operating personnel.

Further, the systems manager should, in attempting to generate a reputation for fairness, technical competence, and resolute courage in presentation, as resolutely shun easy bids for personal popularity, toadying to major executives, and other evidences of "apple polishing." He must uphold the standard of honest technical advice, honestly and factually supported and fairly but courageously presented on the basis of the determined facts and nothing but the facts. This may lead to early difficulties through incomplete understanding of the function, but the old-fashioned copy-book does not mislead when it proclaims the long-term regard of honesty. As a long-range policy, honest ethics cannot lose. These ethics must be fostered in, and given daily exemplification by, all systems personnel. One side of this is to realize that the analyst who cannot recognize, carefully report, and reach conclusions warranted by the facts, or who will manipulate alleged (or even

actual) facts unfairly in presentation, is a danger to the function and to the company. Any such analysts must be detected and, when detected, ought to be separated.

Still, after all this has been recognized, what, in the positive sense, are the sound long-range goals? This writer thinks they are the achievement of a balanced, effective, seasoned staff and a broad plan for their assignment which promises the greatest company return over and above the cost of the function. At 5 per cent net profit on sales, savings from systems work of $1,000 are equal in profit effect to a sales increase of $20,000. Moreover, the systems saving is repetitive. The product sales must be resold each year.

Staff balance refers to balance between youth and age, to balance between various stages of competence, and to the development somewhere within the staff of the specialized knowledge required for company-wide execution of projects. In addition, it suggests balancing of salaries and ultimately of total functional costs with existing potentials of attainable savings. Balance of age is a reasonable scattering of analyst ages through the late twenties, the thirties, and the early forties. There should however, be no downright beginners, who lack a background upon which to draw. Balance of compensation means the establishment of salary classifications carrying salary ranges expressing achievement of varying degrees of competence, with a correspondingly inverse requirement of supervision, and affording overall a progression assuring a good living to the competent senior specialist, comparable with that attainable by third or fourth level line supervisors. Balance of specialization means the presence on the staff of a well-proportioned admixture of engineering, manufacturing, sales, accounting, and administrative systems experience. It also means a basic conception of organization and inclusion of specialized systems skills in form design, report design, work load analysis, punch card practice, etc.

To facilitate achievement of the greatest company return from a balanced staff, the requirements are for proper working facilities, proper project assignment, and proper administration. Presentation of the first and third of these would require the writing of books. I will confine myself in this paper, therefore, to brief exposition of the second factor, project assignment. However, before describing what format of staff and project assignment appears ideal, perhaps one should remind the reader that most companies rarely or never have or can afford a procedures staff large enough to handle everything in the organization capable of being described as a systems project. Therefore, the operating organization must be helped and encouraged to fight most of its own "brush fires" and must not be permitted to allow administration of established and accepted procedure to be a

load upon the procedures department. Overall, the policy for the procedures department should be to work only on accepted, approved, and significant projects and to take no part in the direct, day-by-day administration of installed, tested procedures, once these have been adopted by the operating personnel. Likewise, it is perhaps necessary to indicate that the systems department as envisaged here does not buy forms or office equipment and does not operate office services.

The ideal plan of assignment boils down to the following five, all work being on a project basis and each of the first four assignments to be the responsibility of a senior or intermediate analyst:

1. Study and improvement of the basic routines of the company, in which the bulk of clerical expenditure is incurred.
2. Continuing work-load studies, leading to recommendation of projects, and, more significantly, making it practicable that no additions to salaried payrolls need be approved by management unless justified by unbiased study.
3. Continuing review of reports of all sorts for the purposes of improvement, elimination, or consolidation, with recommendation of projects, as appears advisable.
4. Study of forms, forms design, and forms control for the purposes of forms improvement, elimination, or consolidation, with recommendation of projects as advisable, as a consequence of functional classification of existing forms.
5. Performance of inescapable minor brush fire-fighting (inescapable because of emergencies or in occasional unavoidable deference to the eminence of the request sources), maintenance of manuals, and other lesser routines of systems and procedures operations.

The Systems Department Can—And Should—Prove Itself

Through all of this, the manager of the procedures department must always emphasize that the governing idea is to find, in cooperation with operating personnel, better ways of executing useful activities. These better ways should yield more for the same or less cost or the same for less cost or more for a justifiably increased cost, considering the value to the company of the additional benefits attained. There is also the equally important objective (sometimes it is more important) of the outright elimination of useless, unjustifiable activities. When the quality and quantity of personnel will support the ideal arrangement outlined above, it then, and only then, becomes advisable to adopt the orthodox, well-advertised project program and to use for control of its execution the accepted, modern accoutrements of such administration.

It is hoped that this paper will aid in the systems administration underlying development of an enduring functional foundation, through the suggestion of a few considerations not too frequently encountered in the current literature of the profession. Even the dyed-in-the-wool systems specialist, who makes no claim to possession of noteworthy administrative ability, may, it is hoped, deduce something that may enable him on occasion to avoid unwise choices of employment or prevent his sacrifice on the altars of unsoundly

conceived or faint-hearted attempts at establishment of the systems and procedures function.

In reply to the many who are likely to contend that one should not undertake to operate a systems department which does not have, in advance of its establishment, well-advertised 100 per cent top management support and a large operating budget and staff, one must express respect for the management which requires that these aids must first be merited. There is little reason to believe they cannot be earned under any competent top management group. Systems people have no more right to a blank check from management than has any other function. Since part of our service is to supply unbiased analyses which enable management to deny blank checks to others, we should not want them for ourselves. Nor need we be surprised if some resistance to development of the systems function is a consequence, in a particular case, of a previous unfortunate experience with the full systems panoply under one of these questionable blank check arrangements.

Moreover, the systems function does not require coddling by management. It may be that one reason why some well-managed corporations change the size of their systems staff sharply in relation to very minor changes in the economic climate is an unwillingness on the part of some systems managers to make a painstaking effort to establish the function upon a firm, justifiably enduring basis. The same situation results from the privileged type of systems effort which has proved so vulnerable, the kind established by managements which have no intention of establishing a permanent function and, therefore, use systems technicians hardly. This long-range view is difficult to keep in mind at present, because, as was said at the start, there is an active "market" for systems service. However, for the ultimate good of the systems function, the long view merits closer attention. When it becomes the rule, the systems function will no longer be among the first to feel the pinch of tighter business conditions.

Procedure Write-Ups Which Will Be Read and Followed

by BRYANT L. BATES

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Completeness, easy reading, absence of duplication or cumbrous revision of procedures, and centralization of the preparation and writing of procedures, are among the objectives of the method of preparing and publishing written procedures particularized in this paper. The author provides illustration of the flow charts from which the procedures are written and of the procedures themselves.

WE CONSIDER THAT WRITTEN PROCEDURES are a necessity in the proper operation of our business. To us they are necessary for the following

reasons, let alone numerous others which could be listed:

1. Written procedures tie down responsibility.
2. Written procedures stabilize systems and methods.
3. Written procedures are a positive means of controlling forms and reports.

In order to accomplish the above objectives to the fullest extent, written procedures must be well-planned, organized, and maintained in a procedure manual. Procedures are to systems and methods as organization charts are to a well-organized business. A comptroller of a large company once told me that the main reason for his success was that he had a good organization chart. I would venture to say that he must have had a better than average procedure system, too. Some executives shy away from procedure manuals because, not only are procedures hard to write but even harder to read. I once had an occasion to ask an executive if he had written procedures covering his operation. He said that he had and pointed to a four drawer 8½" x 11" steel file.

In order to overcome the fact that not only employees but executives are negligent in reading procedures, we find that we have to analyze all contingencies connected with a particular operation, possibly even designing the system to be followed in performing the operation, and also digest the system for each particular employee concerned. This makes procedure writing a difficult task but it can be accomplished. The procedure manual we use for an organization of 80 employees is divided into the following categories:

1. Administrative.
2. Purchasing.
3. Warehousing and receiving.
4. Engineering.
5. Customers' contracts and orders.
6. Collecting.
7. Meter reading and customers' billing.
8. Rates.
9. Payroll and personnel.
10. Automobiles and trucks.
11. Accounting.
12. Radio.
13. Property.

Each executive has a complete manual and each supervisor and/or office has a manual covering only the procedures which affect his particular operation. The writing of procedures is confined to one employee in order that:

1. Control will be maintained over the serial numbers of procedure bulletins issued.
2. The bulletins will be in the same language style.
3. The material has not been covered in a previous bulletin.
4. The proposed bulletin is not a contradiction of instructions in a previous bulletin.
5. The proposed bulletin is not an integral part of a previous bulletin.

This does not mean that the procedure writer compiles the material for the bulletin but that all detailed instructions are routed through him to be edited and published. If not, difficulties can ensue. Often, some problem of operation arises for which a

FLOW CHART FOR REQUISITIONING AND PURCHASING MATERIALS - SUPPLIES - SERVICES

STEPS

1. Originating department prepares requisition for materials, supplies and services listing as many items as possible.
2. Purchasing secures approval of person having charge of materials concerned.
3. Purchasing prepares vendor requisition for each voucher.
4. Purchasing prepares purchase order.
5. Receiving files copy of P.O. in active file awaiting material.
6. Accounting files purchase order with vendor requisition in active file awaiting invoice.
7. Purchasing records purchase in commitment control records.
8. Receiving prepares and distributes receiving report.
9. Purchasing matches purchase order, receiving report, and invoice--enters on commitment control.
10. Accounting verifies invoice and prepares voucher.
11. Copy of invoice affecting work orders routed to property department.

COLUMN HEADINGS *

*Column headings are: Originating Department, Purchasing Department, Material Control, General Manager, Receiving, Vendor, Accounting.

The manner of completing the body of the chart in these columns may differ with companies. We use small boxes ☐ connected with arrows ☐→☐ running down or across, as may be appropriate to the step, and containing code numbers, as [1 A], the numeral indicating the step number in the extreme lefthand columns and the letter indicating the document. In the procedure covered by the present column headings, the documents involved are:

A - Purchase Requisition
B - Vendor Requisition
C - Purchase Order
D - Receiving Report
E - Vendors Invoice
M - Material

EXHIBIT 1

minor solution is devised and a procedure writer just grabs a sheet of paper and writes a bulletin about it. For instance, in financial control work, we devised a commitment control sheet. It would have been very easy to have written a bulletin entitled "processing commitment control sheets," but the commitment control form is not a basic form, as is an invoice, purchase order, and voucher. It is not of general interest. Therefore, it is properly combined with the purchasing procedure. The point is that, if bulletins are written on every minor subject which comes up the procedure manual becomes a hodge-podge.

Also, minor procedure changes must not be covered by a new bulletin. To do so makes it hard to take care that instructions are not issued to do the same operation in two different ways. It is easier to revise a bulletin because only a small section need be changed, as the rest of the bulletin can remain unchanged. Just revise that section and, when the whole bulletin is retyped, underline the part changed. It is advantageous to mention in the first paragraph (the purpose) just why the bulletin is being revised. In reflecting on this point, it is perhaps, helpful to consider that the company's whole operation could be covered in one bulletin. The operation starts with the investment of money and ends with a profit or loss. It is a single story but would be book-length. Each procedure bulletin can be likened to a chapter. A revision is an alteration of a paragraph or sentence in one of these chapters, not a new chapter. The point is that procedure bulletins should be kept to a minimum with no duplication of instructions.

How We Write Procedures

We find that the best way to organize and outline a procedure is to lay it

out in a flow chart analyzing each step in the operation, point by point. Each flow chart has to tie in with related flow charts covering continuing operations and each procedure contains references to other bulletins not described in the flow chart on which it is based but referred to there. As a net result, one should be able to combine all of the flow charts on a giant flow chart. The accompanying flow chart description (Exhibit 1) reflects our method. After trying many types, we have found that the chart best serves our purpose. The one illustrated covers requisitioning and purchasing materials, supplies, and services. This subject was selected because it is common to all business organizations.

In writing procedure, we used to start at the upper left hand corner of the flow chart and follow the procedure through from there. No wonder we have experienced difficulty in securing the proper reception of written procedures. In order for an employee to determine just what he is supposed to do, he must read the entire procedure and select his particular duties bit by bit from several locations throughout the bulletin. By the time he reaches one of these applicable morsels of the procedure he either does not particularly care about it or is thinking about more interesting things. The outline of the purchasing procedure under the old system would be:

1. Preparation and distribution of purchase requisition.
2. Required approvals.
3. Preparation of vendor requisition.
4. Preparation of purchase order.
5. Approval of purchase order.
6. Distribution of purchase order.
7. Purchasing department records.
8. Receiving materials and supplies.
9. Correlating invoices and receiving reports.
10. Payment of vendor's invoices.

We have discontinued this manner of writing procedures and instead are writing them covering the data in each column of the flow chart. In other words, the outline for the new style procedure is as follows:

1. Procedure for departments requiring materials, supplies, or services.
2. Procedure for purchasing department.
3. Procedure for receiving department.
4. Procedure for accounting department.

This is much easier to read. Division and department managers have to read Section 1, the purchasing department Section 2, the receiving department Section 3, and the accounting department Section 4. Everything each person reads actually applies to his department. He can read the section and forget about the remainder of the procedure.

We do not regard this as a contradiction of a recommendation already made. We are increasing the number of procedures but not creating duplication. The above procedures were issued in two bulletins, namely, "processing purchase requisitions and purchase orders" and "receiving" as reflected in Exhibit 2. Actually one bulletin is all that is necessary by the strict rule of the system but the "re-

PROCEDURE BULLETINS
Receiving
Receiving Materials and Supplies
Date 6/1/54. Cancels Bulletin dated 1/1/52. **Bulletin C-2, Page 1**

Purpose
The purpose of this bulletin is to explain the method that shall be followed by warehouses in receiving materials and supplies.
Department Affected
The following departments are affected by this bulletin:
1. Receiving department.

Procedure for the Receiving Department
As discussed in Bulletin B-4, the receiving department will receive the 3rd copy of all purchase orders (form 21) covering material to be delivered to their division. These copies will be filed in numberical sequence in an in-process file and are the authority for the storekeeper to receive material.
When material is delivered to the warehouse, the storekeeper will:
1. Make sure that the material has been delivered to the proper location. This he will do in two ways.
   a. Make sure he has a purchase order covering the material.
   b. See that the delivery ticket indicates his warehouse.

Purchasing
Processing Purchase Requisitions
and Purchase Orders
Date 6/15/54. Cancels Bulletin dated 6/1/54. **Bulletin B-4, Page 1**

Purpose
The purpose of this bulletin is to explain the procedure that shall be followed by all offices in requisitioning equipment, materials, supplies or services in accordance with instructions contained in Bulletin B-1. This revision was made to include special instructions concerning the Commitment Control Sheet which affects the purchasing department.
Departments Affected
The following departments are affected by this procedure:
1. Department of Division Managers.
2. Purchasing Department.
3. Accounting Department.

Who May Originate Purchase Requisitions
Any Department of Division Manager, or his designated representative may originate purchase requisitions for required materials and services when authorized in Bulletin B-1. All purchase requisitions however must be approved by the Department or Division Head.
Procedure for Division or Department Managers
The Division or Department Manager shall originate the Purchase Requisition Form 63 in triplicate showing the following information:
1. Date and division or department originating requisition.
2. Where material is to be delivered, only in rare instances will this be different than one of the following:
   a. Newport Warehouse.
   b. Florence Warehouse.
   c. Reedsport Warehouse.

Procedure for Purchasing Department
Upon receipt of the first and second copies of the purchase requisition, the purchasing department shall:
1. Make sure the material is not already available in any of the districts stores.
2. Secure approval to make the purchase from one of the following authorized employees:

Procedure for the Accounting Department
Upon receipt of the purchase order with the 2nd copy of the vendors requisition and any triplicate copies of invoices, the accounting department shall:
1. Check both papers to make sure that above instructions have been completed in detail in so far as is evidenced by the two papers.
2. File both papers in an active file in purchase order serial number sequence.

EXHIBIT 2

ceiving" procedure was broken-out and placed in a separate bulletin for a specific purpose, that is, we have found that best results can be obtained in the operating department by limiting their bulletins to their own particular procedures. Therefore, you see, this procedure system offers flexibility.

Helpfulness of Procedures Extends to Report Control

It can now be seen how the three reasons for written procedures cited at the start of this article, have been served by procedures as written. These write-ups certainly fix responsibility and stabilize the way of doing things. How they control forms and reports may need a further work of explanation. All forms which cannot be classified as stationery must be included somewhere in procedures. All reports also must be included but, in this case, the procedure writer must make certain that each report mentioned serves some purpose and is used by someone. An example of what I mean by this can be given from experience. In a certain company, an employee spent at least a week preparing a report on production. This report was typed and fifteen copies were distributed to various offices. Upon trailing each copy to its destination, it was found that no one looked at it. Not a single complaint was received when we discontinued it. It is easy to start a new report or form and hard to get it stopped even after its purpose is served.

Is Your Suggestion System Making Money?

by PHILLIPS C. SALMAN

Assistant Comptroller, Socony-Vacuum Oil Company, Inc., New York, N. Y.

Many companies have adopted and supported a suggestion award system because it seemed the fashionable thing to do, with no attempt to appraise its results in terms of dollars saved or earned. A least one company wants to know where its system is going in terms of return on cost. Through its experience, as retold by the present author, a generally applicable way is shown to account for the results of operation of a suggestion plan.

DO YOU EXPECT A PAYOUT from your suggestion system? If you do, some way must be found to evaluate it. This is a difficult task. Suggestion systems do not lend themselves to exact calculations. The elements to be evaluated are nebulous but, if one is willing to make certain practical assumptions, an evaluation can be made. The method of measuring the suggestion system, which is described here, is not represented to yield exact results. Nevertheless, it is one which, once established, can show a trend over the years, which is of value to the suggestion administrator.

A few words concerning the organization of our company's sugges-

tion system, serving as background for this article, will be helpful. The general policies of the suggestion-system were developed and are coordinated by a committee, national in scope, composed of executives appointed to it by the board of directors. They are:

1. Industrial relations department manager.
2. Market research and analysis department manager.
3. Transportation department manager.
4. Member of the manufacturing committee or manufacturing manager.
5. Representative of the chief financial officer.
6. Suggestion system coordinator.

The suggestion system was designed to assist management at all levels of the company, by soliciting employee ideas. However, it was not imposed from above. The local management of all major subdivisions of the company made their individual decisions to install the system and appointed local award boards to administer it. From the beginning, the company has maintained that improvements of some type and degree were the sole objective of the suggestion system. A financial appraisal of suggestions has been considered of particular importance, for, if the system is to compare favorably with other uses of corporate funds, it should reflect an adequate return, after covering all expenses of establishment and maintenance of the system, until it can be said that accumulated suggestion savings have provided the working capital requirements of the system. In our case, it seems to have paid out promptly and to have provided an adequate return on investment.

General Bases of Appraisal and Award

In evaluating suggestions (as it would capital investment proposals—and some are) financial management uses certain yardsticks. Admittedly these two yardsticks are not completely comprehensive. They cannot be substituted for common sense. Nevertheless, they are important guides and neither can be disregarded. They are as follows:

1. The payout, which indicates the length of time it will take to get back the original investment but does not evaluate economic life.
2. The return on investment which measures the amount of earnings over the estimated life of the investment. An arbitrary life of 20 years was assumed for evaluable improvements.

Certain types of nonevaluable suggestions did not fit into this plan easily. Although an analysis showed that most ideas awarded over $100 were for direct savings suggestions, by far the greater number of ideas accepted and awarded lesser amounts were of the indirect or intangible type. For these, it was realized that the amount of savings involved usually cannot be measured. Of course, if a safety idea results in a lowering of insurance premium paid, then there is a measurable reduction of cost. However, the amount of increased production or cost reduction involved in safety or other so-called "intangible"

improvements is usually more elusive. Hence, for purposes of measuring the suggestion system payout and return on investment it was assumed that the indirect savings ideas accepted paid for themselves over a three-year period, i.e., that their cost was recovered over that time.

The amount of award given for evaluable ideas is based on estimates of savings effected for the first year. It was realized that total direct savings resulting from most tangible ideas would be greater than that. In order to determine a conservative average of total savings, suggestions accepted during a six-month period were selected at random and, after careful study, the estimated total savings were established at three times the amount calculated for the first year. Most of the top awards made during the period were for ideas which should reflect savings for many years to come. The three-year average is thought to be on the conservative side.

For example, a machinist suggested a job to hold welding ells in place for machining ends of salvaged ells. He proposed separate jigs for each size ell. As a result of this suggestion, 330 additional ells were salvaged the first year, showing estimated savings of $618. It was estimated that an additional 10 ells will be salvaged monthly each year thereafter. In another case, a foreman suggested a method of printing shipping marks and weights on containers automatically instead of by hand or stencil, which had been the procedure. Continuing annual savings were estimated at $1,350. Still another instance was a plan under which the loss of catalyst in a cracking unit was reduced. The idea resulted in very substantial initial and continuing savings.

The Costs of Operating the System

In line with principles of useful cost analysis, the suggestion system costs were divided into fixed and variable categories:

Variable expenses	Fixed expenses
Awards	Administrative expense
Investigations	
Meeting time	
Installation	

Expenses not expected to vary with the volume of suggestions processed were classified as fixed. The variable expenses were those which it was thought would increase or decrease in direct proportion to the volume of suggestions processed.

Awards expense represented the amounts paid to the suggestors. Direct savings ideas were paid for at an average rate of approximately 10 per cent of the first year's savings. Intangible ideas were evaluated as to the degree of benefit to the company by applying a formula which gives weight to the importance of the idea and the limits of use. For statistical purposes, awards expense was divided into the following classifications, by suggestion categories:

1. Monetary savings.
2. Customer relations.
3. Public relations.
4. Employee relations.
5. Improved safety.
6. Decreased liability.
7. Increased sales.
8. Improved procedure or operation.
9. Decreased supervision or equipment.
10. New uses for present equipment.
11. New uses for present facilities.
12. New uses for present products.

Investigation expenses were arrived at as estimates of systems, engineering, statistics and various other departments' costs applicable to the suggestion system. It will be noted in figures still to be given that investigation expenses represented 38 per cent of the cost of processing each suggestion received. It is believed that all of the so-called hidden expenses were provided for in this category. Meeting time expenses consisted of allocations of suggestion board members' salaries, based on the time required of them and the average salaries and labor burden. Installation costs were considered to be plant and equipment additions costs as well as current expense items, applicable to accepted suggestions. Because these expenditures were required to effect the savings credited to the system, the cash outlay was considered a cost of its operation.

The administrative expenses attributable to the suggestions system were controlled by budgets and consisted of the following items:

Administrative salaries.
Posters (national and local).
Promotion expense.
Annual report to employees.
Rent and office services.
Travel.
Stationery and office supplies.
Telephone and telegraph.
Display exhibits.
Forms.
Miscellaneous.

Results of the First Six Years

Averages based on operations during the first six years (1948-53) showed that for every group of twenty-five suggestions received, six were accepted. Of these, one was an evaluable savings idea. The other five were of the nonevaluable indirect saving type. The calculated average savings applicable to each group of twenty-five suggestions received, based on the assumptions previously explained, is broken down as follows, indicating earnings of $75. per suggestion received:

One direct savings idea (evaluable)	$1,600
Five nonevaluable ideas	250
Total savings	$1,850

The average cost of each suggestion received was analyzed as follows by categories:

Variable expenses		
Awards	$ 6	12%
Investigation	19	38%
Meeting time	5	10%
Total variable expense	$34	68%
Fixed expenses		
Administrative overhead	$16	32%
Total average cost for each suggestion received	$50	100%

The number of suggestions received in each of the six years of operation was approximately the same and the

estimated cost per idea received was about constant. The number of awards and the amount of savings varied considerably by years:

1948—14% of ideas received were accepted; savings estimated at $280 per accepted suggestion.

1949—23% of ideas received were accepted; savings estimated at $320 per accepted suggestion.

1950—23% of ideas received were accepted; savings estimated at $320 per accepted suggestion.

1951-3—30% of ideas received were accepted; savings estimated at $330 per accepted suggestion.

Payout and Return On Investment Analyses

As previously stated, it was assumed that the calculated suggestion savings were realized over a three-year period. In other words, savings attributable to 1948 suggestions were recovered proportionately in 1948, 1949, and 1950; 1949 suggestions were recovered ratably over 1949, 1950, and 1951, etc. For example, 1950 savings realized were one-third of savings resulting from 1948 suggestions, plus one-third of 1949 suggestion savings, plus one-third of 1950 suggestion savings. Savings realized in each year were applied against the out-of-pocket expenses to determine the net cash income or outlay for each year. A tabulation of the figures showed that the system required an original capital outlay equal to one and one-half times the gross out-of-pocket expenses of the first year of operation. At the end of five years the accumulated earnings of the suggestion system had, in effect, repaid the original capitalization.

There are many formulas which relate earnings to capital outlay. Perhaps the simplest one is total return on investment, i.e., total earnings, less investment cost, divided by the capital investment. On this basis, if the earnings and costs of the past six years are projected to the end of the assumed twenty-year economic life of the system, the operation will have earned 800 per cent in total return on investment.

It should be emphasized again that the method of analysis used to determine earnings is based upon judgement and assumptions. The dollar results, however reasonable, cannot be accepted as provable facts. However, they do form a basis upon which some idea may be gained of the dollar value of a properly organized and operated suggestion system, and constitute a guide to its continuance and improvement. Although it is thus recognized that the payout and return on investment analyses made are only tools used in aiding management's judgment with respect to the value of the individual suggestion and the system as a whole, it does seem that most managements would be interested in an investment which these devices indicate can pay out in five years and earn 800 per cent over twenty years.

Making A Start on Developing Cost Personnel

by C. ALLEN GOVE

Controller, Kendall Cotton Mills, Charlotte, North Carolina

The considerations which prevent the cost department from being a true school (or any school at all) for its personnel are recognized in this paper which, however, recommends that these difficulties be hurdled or side-stepped for the sake of a more flexible, reliant and informed departmental unit.

INDUSTRIAL ACCOUNTANTS have certainly learned to appreciate the importance of a cost system designed for the particular establishment in which it operates. On the other hand, it is doubtful if the other essential component in a successful cost operation—the people in the cost department—has received commensurate attention, at least in cost literature. At all events, no one will quarrel with us if we say that the caliber of cost department personnel is at least as important in a successful costing operation as the system used. In fact, many will even agree that the system used is well down in second place. The cost department is made up of individuals and can be no stronger than its individual members.

Accepting this, the conclusion is inescapable that, to have a truly effective cost operation, careful attention must be given to development of the individuals making up the cost department. Yet, surprisingly enough, comparatively little attention seems to be given by a large segment (possibly even a majority) of manufacturing concerns to the development of cost department personnel. We will attempt to outline in this article some of the techniques which can be used in developing individual members of a cost department, with a resultant strengthening of the cost operation. It may be said that the comments to this point might apply with equal justification to other staff operations. Thus, we could well insert purchasing department at each point that we have mentioned cost department and come up with the same conclusions. However, there is no need to consider this as lessening in any way the importance which we attach to developing cost personnel but rather that similar thinking should be applied to other staff operations.

There is, however, one factor applicable to cost accounting which seems to me to make a personnel development program even more necessary than in other lines of endeavor. This is the general trend toward centralizing cost responsibility in the controller's office. In this connection it is not necessary to get into a dis-

cussion of the relative desirability of having the cost function a responsibility of the controller or of the manufacturing executive. It is the personal conviction of the writer that either can work successfully if the man directly in charge of the cost department has the right qualifications and if the controller and his counterpart in the manufacturing organization work well together. Further, regardless of how we feel about it individually, there does seem to be a definite trend toward placing cost work under the controller and this trend may well become more pronounced as the functions of the typical controller are broadened and as we move further in mechanized accounting.

But, even recognizing many advantages, we usually find that placing cost work under the controller tends to divorce cost accounting from the manufacturing operations. That very fact supports a contention that a development program in the cost department will go a long way in bridging a hurtful gap and will make a major contribution in minimizing this rather serious objection to integration of production level costing with the controller's function.

Principal Components of a Development Program

It should be made clear at the outset that the principal objective of a development program in a cost department is to enable members of the department to do a better job on their present assignments, thereby resulting in a stronger organization and a correspondingly better cost operation. An important by-product is the furnishing of qualified candidates for promotion either within the cost department or elsewhere in the organization as openings may occur. Too often, however, development programs are planned on the premise that this by-product is the primary objective. When this happens, we usually find that it is limited to a relatively small group and is therefore less productive and often the cause of unrest among those not selected. Another difficulty in overemphasizing promotional aspects of personnel development lies in the inability of management to schedule promotional opportunities to coincide exactly with the demonstrated capabilities of persons in the development program. Here again, we find unrest if promotion is considered the principal outgrowth of development.

For these reasons, the program which is to be described here is directed rather broadly and not to a selected few, and is intended to strengthen each person on his present assignment rather than to guarantee progress up the organization ladder. The fact that a program slanted in this direction often provides candidates for promotional opportunities is in the nature of a dividend. In outlining a possible development program for a cost department, I have rather

arbitrarily made the following list of steps:

1. Provide a favorable climate for self-development.
2. Tie in with a company-wide program if available.
3. Train new employees.
4. Provide opportunity for extensive contacts with other segments of the organization.
5. Offer job rotation.
6. Take advantage of special assignments.

It will be obvious to the reader that this list does not purport to be a complete personnel development program. Entire books are being written with increasing frequency on the general subject of personnel development. Rather, I plan to cover some of the highlights of such a program which I think have particular application in a cost department. I might add further that there is no particular significance to the order in which the points are listed. Finally, although this list has been prepared (and in fact the article written), with a fairly large concern in mind, most of the principles cited and a large part of the program can be applied in smaller cost departments.

Provide A Favorable Climate for Self-Development

It is perhaps a truism that the best development program in the world cannot accomplish its purpose if the individual resists or even is not interested in development. The other face of this coin is that some individuals are so constituted that they will grow in stature whether or not their employer offers any assistance. Assuming a person is somewhere in between the two extremes, as most of us are, there is a wide area in which encouragement can be given by an enlightened management to help a person develop himself.

No pat formula can be supplied on just how this is done, as each person has different needs. In one case, lack of technical background in cost work might suggest a list of good textbooks on the subject which could be found in the local library. This might be supplemented by a routing of *N.A.C.A. Bulletins* and other similar literature. In another case, a public speaking course might be indicated. If the individual is taking a night course or a correspondence course, his supervisor should follow his progress closely to evidence interest and even help on occasions. Usually, the employer's part in this general field of activity is one of encouragement. At times financial assistance may be justified but, as a general rule, we can say that self-development cannot be purchased very successfully.

Interwoven throughout this entire phase of a development program, as well as in other phases, is a need for counseling by the supervisor. He must be truly interested in each person's progress and must be willing to set aside a considerable amount of time to discuss the employees progress, offer advice and, perhaps most

important, pass on to the employee some of his accumulated background in cost accounting, the operations of the company, and more general matters. Most supervisors recognize the importance of this part of their job but, unfortunately, all too often it is brushed aside in favor of work of a more immediate nature. To a large extent, it is a mark of a good supervisor if he can schedule his own work load to permit time for counseling with members of his department.

Tie In With Company-Wide Program; Training New Employees

An increasing number of companies have formal personnel development programs and, obviously, any like program in a cost department should be coordinated with this broader program. One advantage of using the broader program is that it tends to give cost personnel background in other parts of the business and encourages transfers of personnel into other fields. With few exceptions, everyone likes to feel that he has a fairly good knowledge of all parts of his company and that his future is companywide rather than restricted to a single activity.

A second advantage is that a company development program can sponsor activities which would be impractical for a single department, such as sponsorship of a public speaking group, lectures by company officials on policies or industry trends, and the hiring of a training director. These are a few random examples.

Emphasis on training new employees usually pays good dividends because the newcomer is able to absorb background at a rate which will not be possible when he is eventually tied down to a specific assignment. In addition, the typical new employee is full of enthusiasm and particularly receptive to training. Many companies find it well worth-while to have new employees, if slated for cost department assignments, start off by spending considerable time in the plant getting background on the manufacturing activity. Usually this will be a somewhat condensed version of the training program designed for new employees slated for manufacturing assignments.

The second essential part of the training program is in the cost department, itself, where the new employee must gain complete familiarity with the cost system, its objectives and its uses. Usually, it is also helpful for the new employee to spend time in the general accounting department and possibly other departments, depending on the nature of the company's operation and the assignment planned for the trainee.

Extensive Contacts With Other Parts of the Organization

If a cost department is doing its job as it should, it will necessarily have extensive contact with the manu-

facturing organization particularly and other parts of the business to a lesser extent. Development of individual members of the cost group will be a natural outgrowth of this situation. However, this close contact with other parts of the business is not automatic but is rather the result of directed effort on the part of cost personnel over a period of years. Also, as we have pointed out earlier, the trend toward placing the responsibility for cost work under the controller tends to pull the cost group away from the plant. Then, too, the problem of maintaining a close relationship with the plant organization becomes increasingly difficult as the number of plant locations is increased and as (or if) the cost operation becomes more centralized.

If we were asked to pick the most important of the various functions of a typical cost department, we would probably end up saying it is the supplying of information to the plant management to enable it to exercise proper cost control. But the supplying of information does not complete the job, since the plant group must understand it and have no reservation as to its applicability. There must be a mutual understanding between cost and plant personnel on the objectives of the cost control system and a mutual respect for each other. To achieve all this adds up to considerable time spent by the cost group with production personnel — in setting mutually acceptable standard cost factors, in analyzing variances, in making special studies, etc.

In short, extensive contact with other parts of the business and the plant organization, particularly, is an essential part of a well-run cost operation and, in addition, should not be minimized as a part of the personnel development program. For this latter reason, it is important in our development program that outside contacts of the department be directed so as to avoid the natural tendency of having them handled by the most experienced person or persons in the cost department rather than spreading this assignment as broadly as possible. In the short run, assignment of less experienced persons will necessarily be inefficient and occasionally disruptive but the long range gain in the form of a better trained and more flexible organization will almost always out-weigh the initial disadvantage.

Job Rotation; Special Assignments

One of the principal training devices commonly used is exchanging the assignments of individuals, either on a permanent or temporary basis. In addition to developing the individual, we gain the added advantage of a more flexible organization. Job rotation within the cost department, itself, can usually be made to advantage, but it is perhaps even more beneficial to have "job swaps" made with other departments. Many companies

have a formal program for transferring personal between the general and cost accounting groups and find that this plan strengthens both activities. How far the exchanges can be worked out in other areas depends on local circumstances, but there seems to be little limitation. Methods work, purchasing, market research, manufacturing, and even sales are fields open to this device. If the person returns to cost work, we find that he can do a much stronger job and, if he ends up elsewhere in the organization, the company as a whole still wins.

A cost department worth its salt is constantly called on to make special studies and this fact gives another important training area. These studies often require the use of considerable individual initiative as well as a knowledge of cost information available. Further, they may entail working with members of the organization with whom the cost department member normally has little contact. All this adds up to an excellent method of training which should not be overlooked by the supervisor in handing out assignments within his department.

Perhaps even more beneficial as a training mechanism is the special assignment which is outside the scope of the usual cost department activity. For example, a member of the cost department might be loaned to the methods department to draw up a chart showing the flow of all materials through the plant, the quantity involved, the method of handling used, and a summarization of possible material handling improvements which might be made. Or a member of the cost department might be assigned to work with a member of the personnel department in determining how much employee turnover costs in a particular plant. The list of possible assignments is virtually unlimited and the background of the trained cost man makes him particularly good on this work.

If You Want It, Work It

Early in this article, it was said that comparatively few companies give much attention to the development of personnel in their cost departments. In view of the substantial benefits available from a development program, it may seem surprising that more is not done in this area. Thinking back over the various parts of the program briefly outlined on previous pages, it is possible to see why this might happen.

To a large extent, the easiest path and the one affording the more efficient operation of the cost department *in the short run* lies directly counter to a development program. Thus, the immediate job facing the supervisor always seems to postpone the time he would like to spend with members of his department in counseling and other development work. There is usually high pressure to assign a new employee to a productive

job before his broad training can be completed. Further, contact with other departments and special assignments can be handled much more efficiently and with better results by an experienced member of the department than by one of the less experienced persons. Then, too, job rotation reduces operating efficiency and can upset a smoothly running department for a period of time.

With all these pressures running counter to the activation and operation of a development program, it is easy to see why a program may not be set up or may limp along in a haphazard fashion. The corollary seems to be equally clear. The cost supervisor and others in management, should give serious thought as to whether or not a personnel development program is warranted for their particular organization. If they conclude in the affirmative, they should work up a concrete program and, once it is under way, should constantly remind themselves of the ultimate goal and not permit temporary difficulties, which are bound to occur, to sabotage the program.

Letters to the Editor

THE GROUNDWORK FOR ACCOUNTING EQUIPMENT INSTALLATIONS

Editor, N.A.C.A. Bulletin:

WITH STILL FURTHER ADVANCES in mechanical equipment in prospect for future years, all accountants are deeply interested in the development and extension of punch card methods. Much has been written on this subject, but I have as yet to find in any one place, manuscript, or booklet a clear-cut outline of basic procedures which should precede and go along with the actual installation of a punch card system of accounting.

The following steps, which have general applicability to any type of mechanization, seem to me to be basic, and I offer them for consideration:

1. Having satisfied yourself on the feasability and necessity for punch card accounting, a plan should be set up expressing what you expect to achieve during a three-year period. This should include the major applications and a rough time-table of when they will be put on machines. A three-year period is suggested because of the time required to receive the equipment and get detailed procedures underway.
2. When ordering equipment, do not be penny wise and pound foolish, but order a little more than you think you will need. If your preliminary studies indicate at a later date that you have ordered too much, you may be able to cancel before delivery, but you are less likely to be able to order additional equipment and receive it in sufficient time to tie in with your installation.
3. Do not attempt to utilize as a supervisor a man who has not had previous experience in setting up and installing a system. The supervisor should have had some experience in installation of new applications and should have had from three to four years actual experience as an assistant supervisor and be thoroughly familiar with the wiring of basic boards for accounting machines. This man should be hired to report for work a minimum of three months prior to the date the machines are to be installed.
4. The head of the accounting department, whether he be the controller, the treasurer, or the chief accountant, should obtain at the outset the unqualified support of the sales, manufacturing, or operating division of the company depending upon the division to be affected. Meetings should be held with superintendents or department heads who are to be required to furnish the basic data for payroll or other installation. The accounting machine supervisor should sit in on all of these conferences and should, as a result of his previous experience, be able to write procedures and to present his program to management, accompanied by the controller, chief accountant, or treasurer, in such manner that the operating divisions will feel that they can work with assurance that the accounting department knows what it is talking about.
5. The chief accountant, controller, or treasurer should, immediately upon the arrival of the machines, fully acquaint the personnel in his department with what is expected of them and teach them to begin to think in terms of punch card accounting.

The foregoing steps are considered to be basic in the installation of any punch card system. Naturally, the system itself will have to be tailored to fit the circumstances peculiar to a particular business.

LEWIS E. CHITTUM, *Charlotte Chapter*

COST AND BALANCE SHEET INCIDENCE OF LOCAL TAXES

Editor, N.A.C.A. Bulletin:

THERE ARE WELL DEFINED PROBLEMS to be resolved in connection with the handling of real and personal property taxes, both as elements of cost and from

the standpoint of the Internal Revenue Service. Unfortunately, very little literature is available on this subject other than *Accounting Research Bulletin No. 43* issued by the American Institute of Accountants.

We should recognize that real and personal property taxes are quite different in nature than are income and excise taxes which are based solely on some business happening over a period of time. Real and personal property taxes, in contrast, are based on a valuation of property as of a certain determinable date. From a legal viewpoint, the accrual is established as of that immediate date. From the accounting viewpoint the question remains as to which income period should bear the charges. The problem is to reconcile the legal and accounting aspect.

The tax laws and opinions as well as the thoughts of accountants and attorneys vary even as to which determinable date is the legal accrual date. Among the dates to consider are the assessment date, the beginning or end of the taxing authority fiscal period, the date the tax becomes delinquent, the tax period, or possibly the payment due date.

The date to be decided on must be determined by references to state laws and rulings concerned. The Internal Revenue Service recognizes the assessment date. However, under the recent tax law, if a lien had arisen and the owner of the property was, therefore, personally liable, the tax deduction belonged to the owner of the property even if the property was sold and the buyer paid the local tax. This rule was laid down by a Supreme Court decision and, under it, the purchaser is not entitled to deduct the taxes if transfer occurs after either the lien or personal obligation dates. Under the new code, however, that, in case of sale, the sale date controls and taxes paid after that date by the purchaser are deductible by the purchaser and not by the seller, regardless of the incidence of personal liability.

After the tax liability as of a certain date is established, accounting questions follow because the amount of tax is frequently indeterminable then, due to the fact that the rate is not fixed by the taxing authority at that time. There is a reluctance on the part of many accountants to set up a current liability of some indeterminate amount. This thinking, however, is erroneous and could lead to gross misstatement of fact in financial statements.

The problem of determining which income period the tax charges should be applied against is a difficult one to resolve. The choices are as numerous as are the dates for establishing the legal liability. Among the periods to be considered are the year ending or beginning on the assessment date, the fiscal year of the business prior to or including the assessment date, the fiscal year of the taxing authority, or the year on the tax bill (which year may or may not include the assessment date). There is some justification for the use of any of these periods but circumstances must be considered. After a conclusion is reached, consistency must be the keynote. The most practical period appears to be the fiscal year of the taxing authority or the year shown on the tax bill.

The accrual may be set up by charge to operating expense, to miscellaneous expense, to be handled as a separate deduction from income, or by charge to factory burden and its related departmental account, rent income account, or selling or administrative, as may be applicable. The cost must, in most cases, be estimated well in advance if the charges are to be accrued monthly. Advance consideration must be given to such factors as a capital expansion program and an expected inventory adjustment in order to arrive at a reasonable estimate for an assessment base. The rate will

probably be pure conjecture but can be estimated accurately enough to prevent any gross misstatement of costs.

It may follow that an adjustment is necessary to the tax liability account after the tax rate is ascertainable. The concensus is that such adjustments should be made with the current year's provision or as a separate expense item, rather than through the surplus account.

Perhaps these remarks, brief as they are, may help to clarify and stimulate the thinking on this interesting accounting point.

JOHN F. GAITHER, *Evansville Chapter*

TELL MANAGEMENT THE WHOLE FIXED ASSET STORY

Editor, N.A.C.A. Bulletin:

IN SOME OF OUR more progressive manufacturing companies, the investment in fixed assets receives considerably more attention than in other concerns. Those which give it this attention are better able to provide for plant maintenance, replacement and expansion because they demand reports not ordinarily supplied management. These reports are possible through the use of a tabulating machine card which is so prepared as to inform with respect to:

1. Dollar value of assets becoming fully depreciated, by years.
2. Value of fully depreciated equipment included in balance sheets.
3. Investment in fixed assets by:
   - Product
   - Type of equipment
   - Responsibility
4. Analysis of depreciation costs in same breakdown as in 3 above.

Reports of the above nature may be prepared quarterly or semi-annually, there being no value to more frequent presentations. In addition to the above reports, an annual listing by departmental responsibility is made to provide factory management with a "book inventory" of fixed assets for which they are responsible. Since the manufacturing departments are being charged for depreciation costs on the listed items, the factory supervisors are quick to inform the accounting department of any transfers, disposals, etc. which may have taken place without the proper paper work. This type of listing is not common, although most companies have not taken a physical inventory of fixed assets during the past ten years! The need for a thorough physical inventory is greatly reduced wherever listings are reviewed annually by factory supervision.

The tabulating card recommended should be treated as a subsidiary record and used to accumulate and distribute depreciation costs as desired. This card should include:

1. Asset Code No.—To classify item by types, such as presses, motors, furnaces, buffing machines, etc.
2. Product Code No.—To classify items by primary product manufactured.
3. Department No.—To assign responsibility for physical existence and care of equipment. Generally used also for distribution of depreciation costs.
4. Serial No.—A company serial number or tag number should appear on all items of equipment. This enables and provides for easier identification.
5. Description of item—A brief description is required for listing in the book inventory.
6. Year of acquisition—To begin depreciation charges and for statistical information.
7. Original cost—For reporting of gross investment in fixed assets.
8. Depreciable value—To control maximum dollar depreciation charge.
9. Annual depreciation—To accumulate and distribute depreciation costs.
10. Accumulated depreciation—Same as 9, plus reporting information.
11. Stop year—The year in which depreciation is no longer calculated. The amounts in Columns 8 and 10 should be equal to each other in the stop year.

The above detail is given for guidance only, there being any number of variations

possible. In Column 9 for example, depreciation is suggested to be shown as an annual cost. In many companies the monthly charges for this expense is based on estimates, the actual depreciation cost not being determined until year end. If one desires, a monthly, quarterly or semi-annual cost factor may be used. In this connection, reference is made to the article appearing in the July, 1947 issue of the *N.A.C.A. Bulletin* in which J. G. Sidak of Solar Aircraft Co. explains monthly depreciation analysis and how duplicate punch cards are used to control the movement of equipment.

The governing factor as to choice among monthly, semi-annual or annual calculation of actual depreciation is, of course, the number of fixed asset transactions during the year and the policy as to when depreciation begins, i.e., monthly, or semi-annually. The number of fixed asset transactions during the year are generally not too numerous, so that the cost of maintaining the card file is negligible. The greatest effort required is the initial establishment of the subsidiary record. The value secured from this method is immeasurable and, in using it, the accountant has taken a great stride toward suuplying his management with worth while tools.

H. C. GIESLER, *Hartford Chapter*

LET'S INCLUDE DEFERRED ADVERTISING AND RESEARCH COSTS IN INVESTMENT RETURN BASE

Editor, N.A.C.A. Bulletin:

TWO ARTICLES, "Return on Capital Employed—Measure of Management" by F. J. Muth, and "Return on Investment: Gist of a Technical Service Survey" on the subject of return on capital employed appearing in the *N.A.C.A. Bulletin* at this season a year ago very ably fill an important gap in the literature of industrial accounting. However, although both of these articles develop the use of some modification of total assets as the investment base, it seems to me that, in many situations, an addition of some deferred or prepaid charges would be in order. I am thinking particularly of advertising and sales promotion expenses which, under conservative accounting practices, are not usually considered deferred charges although the results of advertising and sales promotion may be felt for years after the expenditure.

Take the specific case of the producer of a nationally advertised consumer product with a very high degree of acceptance. This consumer acceptance has been built up over a period of many years by means of advertising and sales promotion, and the sales volume of the product is higher because of its acceptance. This sales volume would not drop immediately if advertising were to be curtailed, and, since advertising and sales promotion make up a substantial part of the product expense, the producer could show a good increase in return on investment if he cut advertising. Admittedly, this practice would lead to the death of the product if followed over a period of years but, viewed solely from a return on investment angle, it might appear to be an advantageous course to follow.

On the other hand, if part of the advertising and sales promotion expense had been deferred or capitalized to be written off over the effective life of the advertising, a decrease in advertising expense in any one year would not increase the return substantially, because of charges accruing from other years.

From a practical standpoint, there are two limitations to a method such as this. In the first place, for comparative purposes, it is probably applicable only to divisions of a large concern. Information is usually not available to recast competitors' statements in a comparable form. Secondly,

there does not seem to be a sound basis for predicting the effective life of an advertising campaign, and therefore, no basis for capitalizing and amortizing the expense. Nevertheless, many advertising men feel that their planning and evaluation techniques are rapidly developing to the point at which they will be reliable guides for such accounting treatment.

A situation very similar to that described for advertising and sales promotion exists for research and development expense. Most companies which carry on continuing programs of research and development charge off the expense currently, despite the fact that the results of such programs last for many years. It is my feeling that, for the purpose of computing return on investment, a portion of the research expense for past years should be included as part of the asset figure used. This would tend to prevent discontinuance of research work to improve the return on investment and it would afford some measure of the effectiveness of the cumulative research work.

It seems to me that the real value of return on investment is the measure of the effective use by operating management of the tools provided. These tools are not only plant, equipment, cash and inventory, but they are also customer acceptance and accumulated technical "know-how." Regardless of the usual accounting treatment given the last two items, recognition should be given them for the purpose of measuring how effective operating management is performing.

DAVID S. MOFFITT, *New Haven Chapter*

Notes On Current Reading

Books and Pamphlets

Fundamentals of Auditing

R. K. Mautz, John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1954, 406 pp. plus Short Audit Case, $6.00.

A new book, this text is prefatorily labelled (in substance) for students only and not "either a review or reference work for practicing public accountants." It is intended for an introductory course and deals with underlying considerations, such as the nature of auditing and "evidence in auditing" through "basic techniques" and working papers to verification techniques for various balance sheet items and, finally, to the subjects of internal control and audit reporting.

Financial Public Relations For The Business Corporation

Herman S. Hettinger, A Controllership Foundation Book Digest, One E. 42nd Street, New York 17, N. Y., 44 pp., $1.00.

Digested by Paul Haase, this presentation briefs the seventeen chapters of Mr. Hettinger's book which is directed largely to the corporate annual report as a citizenship document, i.e., one which should meet the needs of a wide variety of readers. Other methods of telling the corporation's particular story are also considered.

Testing Your Salesmen's Pay Plan

Research Institute of America, Inc., 589 Fifth Avenue, New York 17, N. Y., 64 pp., 1954. $4.00 to members of Research Institute, $20.00 to nonmembers.

A condensed-impact business-reporting-service type of publication, the pages of this study deal with concretely envisaged selling problems against a background of current practice and possible development of it. There are provided solutions to problems posed by salesmen's incentive pay.

1954 Annual Meeting Papers

American Institute of Accountants, Papers presented at the 67th Annual Meeting in New York City October 17-21, 1954, 165 pp.

Some twenty-five addresses, delivered at the A.I.A. 67th Annual Meeting are published here. Among them are two on the popular subject of electronic applications to accounting and four on "Controversial Areas in Accounting." Most of the remaining papers have specific reference to problems of the public accountant. Two more general ones, delivered on the opening day, are "Voluntary Compliance with the Tax Laws" by T. Coleman Andrews and "The Profession of Accounting: Its Past, Present, and Future" by Maurice H. Stans.

The Controller Reports to Management

Improving Profits Through Cost Control

Vols. I and II of papers presented at the 23rd Annual National Conference of Controllers Institute, 1 East 42nd Street, New York 17, N. Y., 34 pp., 1954, $1.00. (Each volume).

In the two pamphlets identified by the titles given, there are published eleven addresses which were part of the proceedings of last fall's annual conference of The Controller's Institute. Among other emphasis, Vol. I deals with reporting in the areas of cash position, manufacturing costs, capital outlays and sales. Vol. II spotlights — again among other topics — engineering and research costs and service department expenses.

Progress Through Sharing

Addresses Presented at the Thirteenth Annual Conference of the Institute of Internal Auditors, 120 Wall Street, New York 5, N. Y., Paper Bound, 1954, 125 pp., $1.50.

The papers included in this report of proceedings are eight in number and cover electronics in relationship to the accountant, a management view of internal auditing, a summarization of a quarter century of experience in the internal audit field, a current-day appraisal of internal auditing, frauds and defalcations, and exposition of financial organization of a steamship company.

The Use of Break-Even Points in Policy Decisions.

Alexander Campbell, Cost and Management, December 1954.

Employing graphs to illustrate his points, the author of this article considers application of break-even point analysis to such matters (not all considered in particular) as prospective price decrease, determination of volume needed to recoup such a decrease, decision as to whether to institute an increase of prices or volume, marginal selling expenses which can be afforded by company to achieve capacity sales, etc.

How Electronic Machines Handle Clerical Work

Arthur A. Brown and Leslie G. Peck, Journal of Accountancy, January 1955.

Detailing (and contrasting) what is involved in a manual procedure and in electronic "handling" of payroll information, the authors of this article carry their presentation on to some of the details of design of "electronic systems," for record keeping in most accounting areas, as distinguished from "manual or semi-mechanized systems." Conversion procedure is likewise considered.

Operations Research

P. J. Robinson, Cost and Management, November 1954.

Just within the "door" of this ten page article, it is stated reassuringly that "generally speaking, operations research is a technical way of naming 'horse sense with a scientific flavor.'" Application of the technique to inventory levels (automatic inventory control system) and to customer supply point locations are discussed in a fair degree of detail. One book and a list of seven other articles are listed at the end.

Cost Control as a Tool for Management

J. McCall Hughes, The Controller, December 1954.

Because this article is written about (or from the operations of) an insurance company, it is primarily on the control of office costs. It extends, first, to the process of "instilling" cost consciousness among employees and, second, to steps in "installing" an office cost control program. Involved are budgeting, functional cost classification, standard costs, and departmental costs.

How Pitney-Bowes Applies Work Measurement to Its Office

W. Gilbert Brooks, Advanced Management, December 1954.

An active program is described in this article. One section of the paper identifies work covered by incentives in the order and traffic, duplicating, addressograph, mail, payroll, field consignment, "distributing," accounts receivable, billing, sales records, branch accounts, and advertising departments (or sections). General procedure for efficiency measurement is one of the topics taken up in the forepart of the article.

How to Assist Management to Increased Profits Through Internal Auditing

William J. Lehmann, The Internal Auditor, December 1954.

"Protective" and "constructive" services of the internal auditor are discussed in this article, with the comment that the profitability of the former is hard to establish, placing a premium on the achievement of the latter (more neglected) group. Appraisal activities in such areas as industrial relations, plant engineering, material control, purchasing, receiving, traffic and transportation, production control, and inspection are mentioned.

SELECTED ARTICLES FROM ACCOUNTING PERIODICALS

AUDITGRAM, *January 1955* (The National Association of Bank Auditors and Comptrollers, 38 South Dearborn Street, Chicago 3, Illinois)
Electronics As Applied to Bank Accounting. Jerre D. Noe

AUSTRALIAN ACCOUNTANT, *October 1954* (430 Bourke Street, Melbourne, Australia)
Sales Forecasting and Budgets. E. E. Dunshea

CANADIAN CHARTERED ACCOUNTANT, *December 1954* (10 Adelaide St. E., Toronto, Ontario, Canada, single copy $.50)
Financial Controls over Materials. Robert B. Taylor

THE CONTROLLER, *December 1954* (1 East 42nd Street, New York 17, N. Y., single copy $.50)
*Cost Controls as a Tool for Management. J. McCall Hughes
Personnel Budgets. F. W. Burton
Accountants Study Electronics at AIA Annual Meeting.
A Streamlined Remittance Procedure. Jon B. Shastid

COST AND MANAGEMENT, (66 King Street E., Hamilton, Ontario, Canada, single copy $.50)
November 1954
*Operations Research. P. J. Robinson
Cost Reduction in the Limelight. George Moller
December 1954
Fading Profits Require Action. Frank Willcox
*The Use of Break-Even Points in Policy Decisions. Alexander Campbell
Some Significant Issues Confronting Management. Panel Discussion

THE INTERNAL AUDITOR, *December 1954* (120 Wall Street, New York 5, N. Y., single copy $1.00)
*How To Assist Management To Increased Profits Through Auditing. W. J. Lehmann
How Can the Auditor Improve His Evaluation of Personnel? R. H. Fletcher
Survey of Audit Reporting Practices, Chicago Chapter of Institute of Internal Auditors.
An Outsider Looks At Internal Auditing. Lloyd F. Morrison
Specific Records Management Problems. R. W. Strauss
Independence And The Internal Auditor. F. R. Wolf

JOURNAL OF ACCOUNTANCY, *January 1955* (270 Madison Avenue, New York 16, N. Y., single copy $.75)
*How Electronic Machines Handle Clerical Work. Arthur A. Brown and Leslie G. Peck
What Is Book Value? Maurice H. Stans and John P. Goedert
Accounting Aspects of Self Insurance Programs. Leslie R. Loschen

RETAIL CONTROL, *December 1954* (100 West 31st Street, New York 1, N. Y., single copy $.75)
Suburban Developments—Capital Investment Opportunities. Perry Meyers

SELECTED ARTICLES FROM BUSINESS PERIODICALS

ADVANCED MANAGEMENT, *December 1954* (74 Fifth Avenue, New York 11, N. Y., single copy $.75 to members, $1.00 to nonmembers)
Decision Theory: Operations Research in Management. Dr. George E. Kimball
*How Pitney-Bowes Applies Work Measurement to its Office. W. Gilbert Brooks

MANAGEMENT METHODS, *December 1954* (141 East 44th Street, New York 17, N. Y., single copy $.50)
A Fast Start for Your Company on Electronics for the Office.
The Cost, The Causes, the Cure for Absenteeism. Louis E. Newman

THE OFFICE, *December 1954* (270 Madison Avenue, New York 16, N. Y., single copy $.25)
How New Tax Law Affects Replacement of Equipment. Joseph J. Schwartz

For Your Information

Problems At the Center of Management

In part, at least, management is a state of mind which any employee of a company may assume. So regarded, it includes, among other elements, acceptance of responsibility, appraisal of results of actions, planning for improved results, and effective personal relationships in the discharge of all functions. This fractional management which almost all employees share becomes total management in the office of company president. The relative weight of the elements making it up do change. However, all the elements which have been named are still there.

In short, management is of the tissue of business. This conviction may help individuals in top management, middle management, and immediate management—and there are accounting positions at all these levels—to read some current literature thoughtfully and without self-consciousness. The literature to which reference is thus made is comprised of several articles relating to the work of company executives. Personal considerations are hard to get out of mind and even a sales manager or controller might accuse himself of doing such reading with a "wish I was him" complex. However true, this need not be made an accusation. Interest goes beyond that. Company presidents just get the most concentrated doses of management and their work and reactions are objectively interesting for that reason, apart from the normal desires for maximum advancement, properly entertained by all. However, it should be mentioned also that there are other high goals than executive office, even in business. Nevertheless, a successful company president is a Grade A sample of the business management process with which all businessmen (line and staff) are concerned.

The managerial function (and the obstacles facing it) is the underlying subject matter dealt with in the three articles to which it is desired to call attention here and which are individually commented upon under the sub-headings which follow. The first, "What Makes Business Call in the Doctors" *Business Week*, December 11, 1954 (330 West 42nd Street, New York 36, N.Y., single copy $.25) considers the managerial problems which executives are currently referring to consultants. The second article "What Presidents Think About" by Wells Norris, *American Business*, December 1954 (4660 Ravenswood Avenue, Chicago 40, Illinois, single copy $.35) reports problems on the minds of a large but relatively young group of company presidents and how they think of their jobs. The third paper, "What Makes a Good Company President?" *Dun's Review and Modern Industry*, December 1954 (99 Church Street, New York, N.Y. single copy $.75) supplies a more extended and philosophical commentary by each of three company presidents.

Troubles the Shooters Shoot At

The first article to be noted deals with the problems which may be said to have "ganged up" on executives. *In Business Week*, "What Makes Business Call In The Doctors" (complete citation above), the eight reading columns of the four pages of the presentation, which would need to be read for its full effect, are studded with mention of unsolved managerial problems. Just because they are fundamental, the mind at once inquires why they are un-

solved or, at least, why they are not in the course of effective solution by the company's staff. This spontaneous inquiry does not do damage to the truth that business maladies, whether they require serious operation on the body corporate or yield to the simpler adjustment of improved methods, may need the services of independent consultants. These carry helpful ideas from the world of business in general to one business in particular.

However, when it is learned that business "calls in the doctors" because its marketing function is at loose ends, its organizational setup is not sufficiently cohesive and purposeful, and its costs are out of hand, one cannot help but reflect that these are areas in which the company's own functional units, which know its operating conditions intimately and have continuous access to the relevant information, have the first opportunity for effective diagnosis. In particular, the management accounting function, if sufficiently sensitized to the information it channels and sufficiently in communication with other management groups, may be said to have such an opportunity. At all events, management accountants will react reflectively to recital of a few of the problems which executives find it necessary to take to outside consultants.

In commenting in turn on marketing, organization, and cost reduction problems as presented to consulting firms for solution, the *Business Week* article supplies for each of the subjects brief case illustration, for which readers of the *Bulletin* are referred to the article, itself. Besides these, there is particularization of basic unsolved problems currently cropping up in the several areas. Among them, with respect to marketing, are the premium price of additional volume, the extent of the product line and the market (and in relationship), the "high cost of salesmen," and improvement of turnover. Among organization problems mentioned are the secondary effects of postwar product diversification (putting the company in many businesses, sometimes at differing levels with respect to the consumer), effects of decentralization, and restricting information developed for executives to useful items only. As to cost reduction, which is ranked below the other two groups in claiming consultants' attention, inquiries for services are received relating to applications of automation and to labor cost reduction devices.

Management accountants will not fail to see in all of these problems a broad place for accounting information in their solution. They are the management decisions to which the practice and literature of industrial accounting has been increasingly directed. That managements badly need help on the factual and cause-and-effect side of these problems will be recognized as one of the continuing challenges to accountants.

The Conversational Frame-Work

American Business' "What Presidents Think About" (complete citation above) is a concise two-page picture-illustrated spread and comments on the results of a survey of "393 members of The Young Presidents Organization, a group limited to men who became presidents of their companies before they reached 39 years of age." It is apparent that, by and large, these individuals head small or medium-size companies. The article begins with a personality sketch of young executives in terms of vital statistics, e.g., size of family, and proceeds to their principal concerns in "improving themselves." These concerns include better interviewing, public speaking, work planning, conference leading, writing, memory, reading and new idea techniques.

Perhaps the most significant comment from the point of view of presenting a picture of the situation in which discharge of executive duties exists is that (for these individuals) "over 80 per cent of their time is spent talking to people, not including telephone calls or dictation time." It is further stated that "the bulk of these talks involve production and sales, although other subjects such as community and public relations, finance and personnel are topics of discussion," thus further particularizing how this 80 per cent talking time is spent.

If it is interesting to management accountants to know that pure management time is essentially an oral exchange and that it involves subjects upon which the accountant is informed, it may be of the same or greater interest to note that somewhat equal importance seems to be attributed by these executives to sales and costs. Moreover, the interest in sales appears to relate to their profitability. Also expressed is a desire on the part of these presidents to develop away from their previous specialties, e.g., production, sales, engineering, toward a better perspective. Lastly, apprehension about handling the effects of a downturn was voiced because, as young executives, it came to this group as a new problem. Accountants may well conclude that, if this is management, they are ready to share it, in full self respect and equally high respect for the other functions it combines.

Presidents Sum Up

Dun's Review and Modern Industry's "What Makes A Good President?" (complete citation above) is composed of three contributions written by the respective presidents of The Chase National Bank, York Corporation, and Sonotone Corporation. They are, in a sense, philosophical in character—at least as contrasted with the two articles just considered—and, in all, cover about two of the publication's rather large-size pages. Percy J. Ebbott of Chase enlarges on interest, industriousness, imagination, and integrity. Stewart E. Lauer of York gives greatest emphasis to the president's acceptance of responsibility and his relationships with others. Irving I. Schachtel of Sonotone also stresses personal relationships and develops the theme of their susceptibility of creating a masterpiece of cooperative effort.

(As this issue of the *N.A.C.A. Bulletin* goes to press, it is noted that the January, 1955 issue of *Dun's Review and Modern Industry* continues the above series with presentation of similar expressions by James H. Rand, President of Remington Rand, Inc., Robert H. Morse, President of Morse and Co., and Walter H. Wheeler, Jr., President of Pitney-Bowes, Inc.)

These appraisals might possibly be characterized as, in somewhat different ways, representing management as a forward thinking process, engaged in under pressure of responsibility for achieving best results for a company in the years ahead. It can be noted that the thinking must be accompanied with the courage which will enable action. It may also be noted that bad thinking will result in disastrous action, no matter how courageous. Again, industrial accountants will discern that evaluation of facts is a central essential to the picture of management which is conjured up and may themselves be stimulated and made more responsible by this perception.